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THE LOOM OF PREHISTORY

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By

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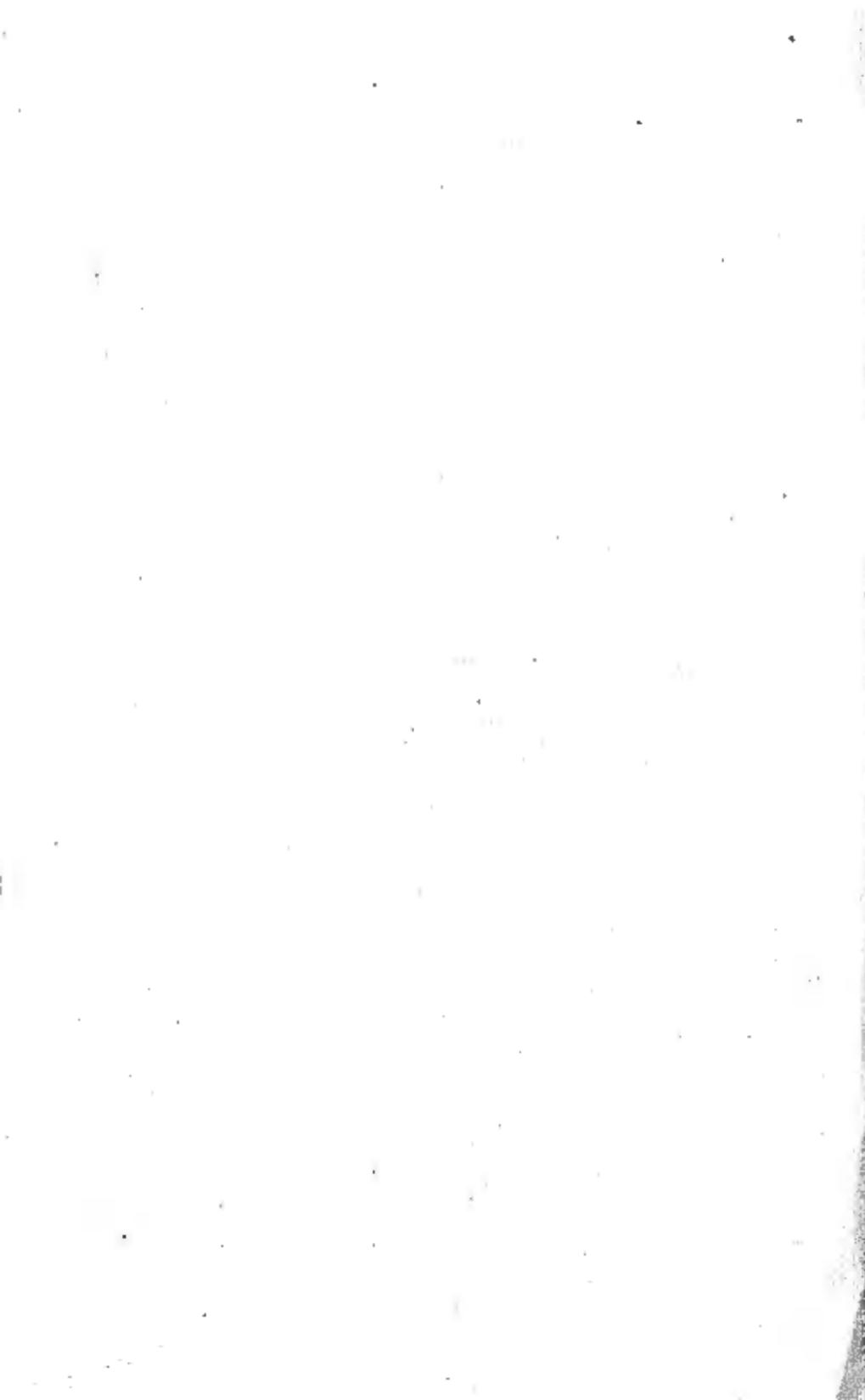
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PREFACE.

This is the second in the Handbook series issued to members of the Society free, if published during their period of membership. It is our intention to complete a series of similar Handbooks covering a variety of aspects of South African Prehistory. These will be issued annually, and will be illustrated as funds permit. They will probably appear in the following order, and under suitable titles.

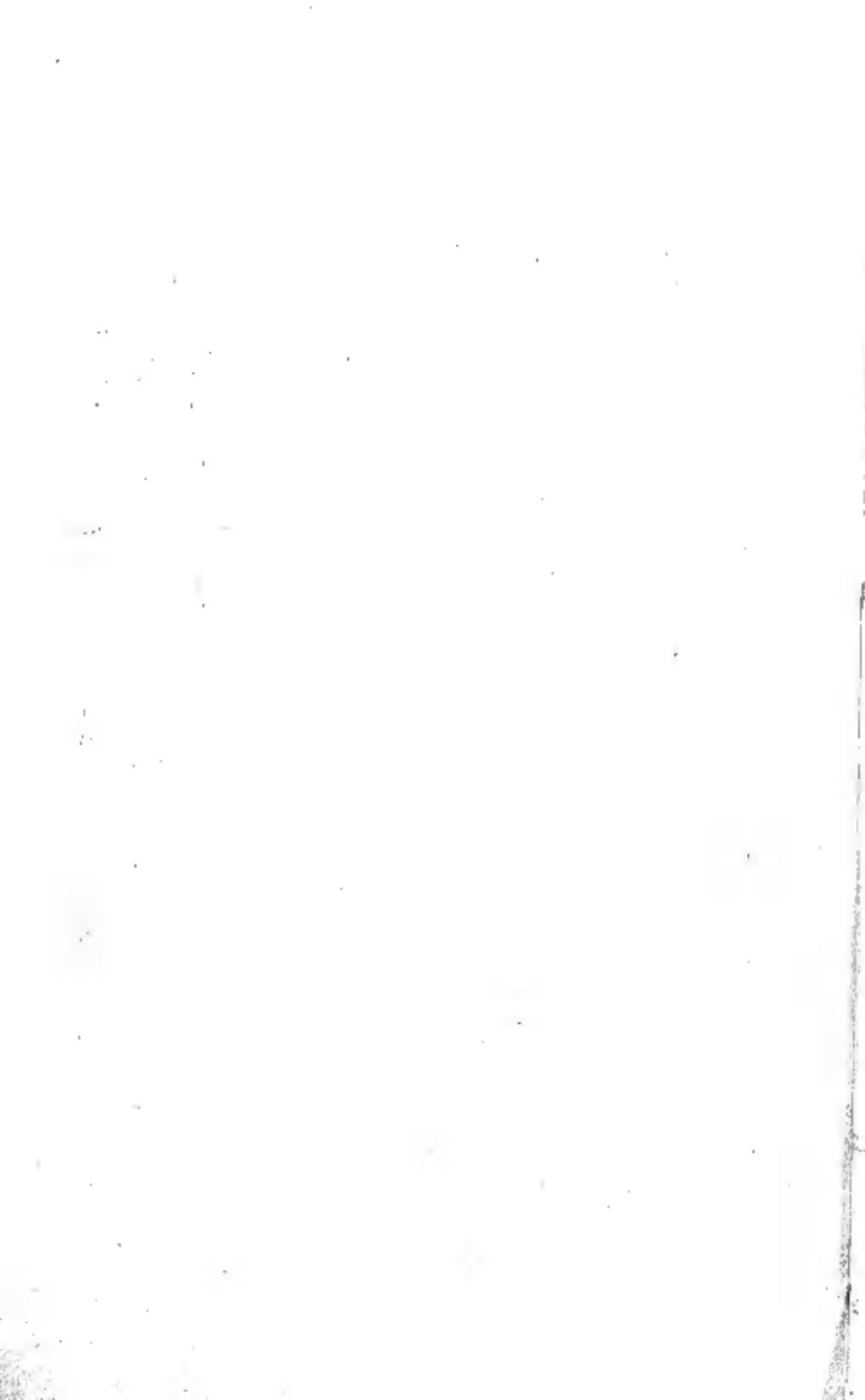
Handbook III. Paintings and Engravings. Due in 1947.

Handbook IV. Prehistoric South African types. Due in 1948.

Should we find reason to change the order or title, or to discard any of these subjects, we shall do so. Should the series prove as successful as it is proving so far, we shall continue under such titles as, "Survey of associated faunal remains" "Survey of climatic and human geography", "Survey of the Zimbabwe complex", "Survey of prehistoric and protohistoric pottery", etc.

It is intended by this means to place the study of South African prehistory on a firm foundation, so that individuals and institutions here and in other countries may be provided with a series of source-books to which they may turn for authentic information on Southern Africa.

The present volume is intended to provide a brief survey of various regions in Southern Africa, with appropriate references, from which more detailed information can be obtained. This is the first time a regional approach on such a scale has been attempted, and it is sincerely hoped that future writers and excavators will think in terms of the surrounding areas and environments, rather than in terms of an over-generalised view of the sub-continent as a whole. Local climates, local sources of material, local needs and local variation are all part of the warp and woof of the Loom of Prehistory.



ERRATA.

- p. 56. Right-hand col. of sequence, lines 4 and 5, read
"Rolled implements from the older terraces".
- p. 89. Under "Southern Bechuanaland", lines 4 and 5, read
"suggesting".
- p. 147. Under "M", first line, for "Pre-Chilean", read
"Pre-Chellean".



THE LOOM OF PREHISTORY.

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INTRODUCTORY

In 1925, — part of the work entailed in developing the terminology of South African prehistory, I found it necessary to build up a full bibliography of material published to that date. This included prehistory, physical anthropology, prehistoric art and various other subjects coming within the purview of Archaeology. This work was of course continued, and in 1933 the references dealing with implement types and stratification were isolated and submitted in the form of — essay to the Inter-University Committee for African Studies in July of that year. A sub-committee was appointed, including Mrs. R. F. A. Hoernlé, Dr. J. Engelbrecht, Professor T. F. Dreyer, with myself — convenor. Professor C. van Riet Lowe — co-opted immediately on his appointment to his present chair in April, 1935. I continued to make necessary additions to the manuscript until May 1935, and as a result of the suggestion of the sub-committee — analytical index — added, together with two footnotes, while — sentence was excised. In this final form the work was published in August 1935, under the title "A Commentary — the history and present position of South African prehistory, with full bibliography**". This contained nine-four pages of commentary, and four hundred and eighty bibliographical references. In addition various sub-references to reviews, translations and abstracts appearing in various overseas journals were included. This supplied the South African investigator with a very complete source-book for local prehistory to that date.

The following pages — not intended to cover this field once again. The history of any science is the most revealing approach that a newcomer can employ, and those who have prehistory at heart will find almost every early reference to prehistory in the publication quoted above, and should make full and appropriate use of that work. The present Handbook is intended to augment and supplement the original Com-

**Bantu Studies*, IX, 4, pp. 219-417. Witwatersrand University, 1935.

mentary and Bibliography, but it is designed somewhat differently, with the intention of providing a clear regional picture of what has already been achieved in southern Africa and to illustrate how much the amateur can do (and, indeed, has already done) to make good the vast gaps in our knowledge.

Bibliography is an essential tool in any study; but it is merely a dull skeleton unless it is provided with a comprehensive commentary, prepared in such a form that the reader may browse and discover what he wants to know. If he wishes to go further, the references are provided and will give him a more detailed and complete account of published fact than any summary can hope to achieve. Wherever possible commentary has been given under its appropriate region, and place names are cited freely. Any reader is thus able to peruse this Handbook, and concentrate for further reading upon those studies which apply to his own region or to his specific interests. It is often impossible to obtain works of reference locally, but a day's visit to one of the larger public libraries should permit of very considerable access to the appropriate reading for a single area. Unessential literature can then be eliminated, and study focussed upon a few works that yield the most important clues to the field selected.

With these two source-books at our disposal there is no possible justification for refusing to acknowledge our debts to past workers. Their work may have been inadequate, ill-guided and even misleading; but references quoted in a paper give it added value that will enhance and orientate the material published, and render its assimilation more pleasant and complete.

THE INTENTION OF THIS WORK

This is the Loom of Prehistory: it is intended to attempt some analysis of the interweaving elements of time, culture, man and area in the light of past research and publication. We dealt with the source of each thread in the Commentary and Bibliography of 1935, and we are now trying to weave these into a patterned fabric, selecting our threads, relating them to another, and evolving a fabric which should

provide the cloth from which something new ■■■ be made. Rejecting tenuous and shoddy strands, we shall first discuss briefly those publications which have really added to ■■■ knowledge of the subject and created its interest. Following this historical approach, we ■■■ deal with more recent work carried out since about the beginning of the century. As time passes ■■■ find that investigation is achieving new standards and new aims. I think we can fairly credit the beginnings of increased co-operation and exact observation to the Congress held at Pretoria in 1926, when a terminology suited to southern Africa was evolved. But all the credit must not be given to that moment: much was achieved at the time of the visit of the British Association to South Africa in 1905, much must be credited to such names as Rickard, Johnson, Péringuey, Balfour, Haddon and ■■ dozen and one others.

Publications ■■■ next grouped under regional subheadings, and commentary is kept under its appropriate area. In a continent such as ours, never alternately confined into pockets by glacial action, and released for invasion and change by interglacials, some sort of regioning is essential. It becomes abundantly clear that ■■■ have certain ■■■ of attraction and plenty, which have varied through the history of changing climate, and other ■■■ of aridity and scarcity, which have perhaps not always been as they are to-day. Sometimes marked mountain barriers divide these areas of attraction or repulsion, while in other parts of the country they shade into one another. Whatever these barriers may have been, mountains or deserts, none was impassable; ■■■ was so great that it could not be evaded in ■■■ way. Through each lay difficult paths; perhaps along ■■■ stream to its headwaters, and down another stream to its mouth; perhaps along a particular pattern of streams only reliable in a good year. Such paths would have been used seldom, for the first wandering adventurer who crossed ■■■ desert or mountain must have realised that the hostility of man or of nature might well force him to retrace his steps through similar difficult conditions. But behind each barrier, separated from other major areas of southern Africa, there often lay ■■■ by-pass. The south-east and southern coasts provided ■■■ highway, cut off in varying degree from the plateau country inland. The comprehension of barriers

acting in these two ways provides ■ with an understanding of the "lie of the land", the grain of the country ■ ■ whole.

Man is affected by ■ variety of aspects of his environment. It is from the storehouse of nature that he must draw his raw materials and his foods. The game that either grazed on ■ particular area from year to year, or else migrated ■ some wide stretch of unfriendly territory for short spells at fixed times (two very different sets of conditions), must have affected the settled distribution or nomadic customs of man in the appropriate areas to a marked degree. Where stone implements ■ the only surviving element of his culture, these must be considered in the light of the available materials to hand in each area. We may find an area in which one type of stone predominates, or where one appropriate source alone can supply man's needs. In another area a wide range of suitable materials may occur, ■ that in different phases of man's development different choices and selections will be made. This must have had profound effects upon the evolution of techniques, ■ that man's traditions have been constantly diverted into new channels of expression, and the diversions so created have passed into new regions to face ■ materials and to create new variations, inventions, and adaptations. That pattern is far more evident in southern Africa than in the flint areas of Europe.

In selecting our eventual regions all these factors will have to come under consideration; attraction, barrier, aridity, raw materials, sources of food and ■ on. What these regions will eventually be we cannot possibly foretell at this time. Factors ■ still incompletely understood, and the curse of political boundaries makes their comprehension difficult, and the definition of suitable regions so much the less certain. One thing is abundantly clear from a study of Darryll Forde's *Habitats, Economy and Society*; it is the special characteristics of ■ environment that make it an attraction or a barrier, not those supplies shared by every region of a country. These special characteristics alone have the power to change ■ culture from place to place, and they may act differently upon differing cultures. The question remains; which special regional characters were important to each successive culture of pre-

historic South Africa? This can only be answered adequately in the long future years of our subject.

The regions here employed are thus only tentative, based in part on our knowledge to-day, and partly upon political boundaries that have rudely limited knowledge to a line drawn on a modern map, and have confined survey and individual alike to investigation up to unnatural barriers. All this must be permitted to sort itself out. Meanwhile we must work to the pattern here laid down, shifting our boundaries, subdividing, augmenting and clipping the edges to fit the truth as we slowly discover it. To impose a hard and fast pattern of regions would fetter investigation.

Cutting directly across all this question of regions is the highly important series of questions raised by migrations. Little has been attempted in this field, but it is a fascinating subject for the prehistorian with an ethnological outlook, and one that should be studied in direct relation to local environment as it is seen by the pedestrian and the nomad.

After discussing our material by regions, I have added a short account of the more important general works on pre-history in southern Africa. Where these deal more directly with regions, they have been placed appropriately. These are works that every amateur and professional should know intimately and should have on his shelves or at easy disposal in a public library. These are often referred to in the regional text, but are grouped once again under the heading General Works with an intimation of the field each covers, and subjects they discuss.

It is hoped that this Handbook will provide a fairly clear regional picture of the existing knowledge of our subject. Unhappily funds and time do not permit us to illustrate this Handbook adequately, so that reference is still necessary to original works given in the bibliography. This is as it should be, for no abstract can cover the nuances and the wider field of full publication.

It has not proved possible to include South-West Africa or most of the Kalahari in this Handbook, owing to the complete absence of any comprehensive series of sites or deposits, either published or unpublished, from this vast area. Some

information can be obtained from V. Lebzelter (1930) and deductions have been drawn from analogies in the Union in Obermaier and Kühn, *Bushman Art*, Oxford, 1930.

HOW TO USE THIS VOLUME

Read directly through the book to get a good idea of the general approach. Then re-read that section referring to the region in which you live, and to any adjacent regions which lie near you, or apparently belong to a similar migration route. Check the references in your own area by looking at the alphabetically arranged list at the end. Within each list of books written by a particular author, these will be found quickly under the appropriate date. It may be wise for the reader to add to the bibliography the number of the page on which each book is described, if he feels the need to refer back from title to commentary.

THE LOOM OF PREHISTORY

PART I

HISTORICAL LANDMARKS

Early travellers in South Africa mention curiously little about the implements used by the Hottentot and Bushman natives at the Cape. Even illustrations in works of travel have been submitted to the engraver's or the woodcutter's art and have passed beneath the graver of some French, Dutch or English firm, so that distortion of detail has resulted, with a consistent bias towards things known and understood in Europe. In translations and second editions the plates have been recut and reversed, and curious differences arise in detail which further reflect the type of error present in the first plates to be cut. It is clear from Van Riebeek's diaries that kitchen-middens were still in process of active formation in his day. The aborigines were distrusted, as they themselves distrusted the pale invaders, and contacts seem therefore to have been essentially formal, trading or parleying, but never intimate.

Descriptions of weapons are not numerous, but —————— of the earliest writers, Dapper, (1668) ascribes iron and copper weapons to the Hottentots at the Cape. "The weapons of these people consist in bows and arrows and darts or crude assegais. The latter are sticks, three, four or five feet long, covered at one end with a broad but sharp pointed iron head, which they themselves are able to forge and shape. . . . By watching our countrymen, however, they have learned to forge for themselves the points of their darts and assegais from bits of old iron, which they find thrown away by us here and there."

His reference to the use of copper for "chains of red and yellow copper beads" is perhaps qualified by his earlier statement that "after the conclusion of these festivities, the chiefs were presented with red beads ('met rode kralen'), copper sticks and copper plates."

The only suggestion of stone age usage lies in the remark: "Instead of steel and iron needles they use a hard and sharp little thorn." It needs little imagination to translate "thorn" ■ "polished bone."

Bergh and Schryver's journals (1681), in the Introduction to the Van Riebeek Society edition (p. 31) recount how on December 21, 1681, a petty captain owing allegiance to the Cochoqua chief, Gonnomoa, returned from a journey inland. "They had brought with them a few pieces of copper ore which they themselves had taken from a mountain. These pieces had been fused together by heat so ■ to make a single piece, but they appeared to be unacquainted with the art of smelting."

But all this is negative evidence that merely goes to show that, even if the early Hottentots were capable of fusing odd bits of ore together, they were not habitual users of metal. The complete absence of metal in any known archaeological deposits at the Cape suggests most clearly that the Hottentots ■ users of stone exclusively. One iron spearhead from the University of Cape Town playing fields (certainly of Nguni origin) and one fragment of European sheet-lead from a cave burial in the Wilderness area are the only examples known.

When we turn to the early manufacture of pottery, we have a lucid description by J. G. Grevenbroek (1695). "The women also make earthenware vessels quite skilfully out of moistened clay. They dig up the clay and carry it home, where it is cut up into portions the size of ■ walnut. These are placed ■ ■ skin and sprinkled with ■ little water from time to time to prevent their getting too dry. They ■ then kneaded into little cylinders, like bottles, each an ell long. The first step is to mould the clay into a circle to form the bottom of the pot; then by further modelling they make ■ deep or wide vessel as suits their fancy and the law of proportion. This is polished and smoothed inside and out with the fingers and with a sea-shell, and smeared all over with a red colouring matter rather like minium (cinnabar, red lead). The pot is then left for a day or two in the same house in which it was made, well covered with a skin or mat, lest it

get too much air or wind, and so dry too quickly and fall into cracks. Finally the pot is stuffed with dry cowdung, provided with handles and placed on a bright fire. After baking it is ready for various uses."

This is supported by ten Rhyne (1686) who, after describing the Hottentot — of seashells or tortoise carapaces (*ririgoos*), adds that the "richer among them make most beautiful clay pots, intended for cooking, while some make oblong troughs for food out of tree trunks."

Ten Rhyne also notes that "the native equivalent of a sword is a club, the common soldiers carry one with a node at the top, the officers one without a node." Later he gives the native name — "kiny", possibly a misprint for "kiriy", as Kolb gives the form "kirri".

J. G. Grevenbroek says elsewhere that the Hottentots "wear a wallet hanging from the neck on to the breast, in which they carry — arrowhead, — knife, tobacco and a tube with which to drink the smoke of it." It is very curious to realise that these tubes, shaped like a cigar-holder, were in use as early as the seventeenth century. Later he says that they "carry in their right hand a dart, lance, spear or javelin with a long, broad, and sometimes curved and barbed iron spike at the top. Sometimes the weapon is fitted with sharpened bone. On one of their arms they — six or seven or more ivory armlets or bracelets, each of the thickness of a finger and touching one another. This is — much for protection — for ornament. . . . In the left hand they carry a club — staff of hard and heavy wood, like box, together with a bow and — arrows. . . . There is poison in the hurtling iron."

These various quotations from early writers have been included here, as much of the material culture described should have survived to this day. Three hundred years is by no means — long period for ivory to persist, and remnants of iron, whether traded from the "Company" at the Cape or with the Kafirs across the Kei River, should also have survived this relatively short period, even if swollen and laminated by rust. Later writers — the early population of South Africa — be sought elsewhere.

Early Writers

Apart from a few references to bored stones given in the works of such writers as Sparrman, Burchell and others, and the evidence of a note by Lt. William Paterson (1789), who mentions the use of stone implements near Kubiskow, our first true antiquary was certainly Colonel J. H. Bowker. George Busk (1869) says: "It was in 1855 that I first saw spear or arrowheads of stone, which had been dug up by Mr. Bowker near the Fish River, in the Eastern Province, about eighteen feet below the surface of the soil. I saw them in the possession of Mr. Edgar L. Layard, curator of the Museum in Cape Town." Feilden in 1883 states that Bowker had presented 41 implements from the mouth of the Great Fish River, to the Royal Artillery Museum, then housed in the Rotunda at Woolwich, before 1866. Bowker himself (1884) refers to an anonymous article in 1869, written for the Cape Monthly Magazine, submitted by him, but pirated elsewhere. In speaking of the Basutoland caves he says: "Most of the caves were or had been used as dwellings for ages; and numbers of prehistoric stone implements were strewed about; but none of the people could ever remember having seen them in use, and seem to think that they had been brought by the Bushmen. Some of the collections—bones, stone implements, etc.—are now in the Cape Town museum; others were sent to the late Sir Charles Lyell."¹

Unhappily all, or almost all, of the Cape Town museum collection disappeared at about this time, and the collection had to be started afresh. E. L. Layard (1870) repeats Bowker's claim to fame, and Dr. J. J. Hewitt has recently been investigating the matter, and his findings should see publication early in 1947. The Bowkers must have been a remarkable family, and three interesting members (the two brothers and a sister, Mrs. Mary Elizabeth Barber) were known for their contributions to various aspects of science in South Africa.

Sir Langham Dale

Langham Dale (afterwards Sir Langham) had his interest aroused at about this time, and George Busk's original paper

¹ See Gooch, 1881.

was based upon implements sent to England by his brother, C. J. Busk, and Langham Dale. Lord Avebury (then Sir John Lubbock) made use of Dale's and Busk's material in a paper to the Anthropological and Ethnological Society of London (later the Royal Anthropological Institute), which appears in their first volume in 1869. In the following year Sir John compares implements from different parts of Africa with European and Syrian specimens. He notes that "a very common type of stone implement in Europe, the scraper, does not appear to be abundant in Africa." In view of the abundance of scrapers that were to appear later, away from the Cape of Good Hope, this comparison is certainly ■ example of a little learning being a dangerous thing. In a later paper (1870B), Sir John refers to an article and specimens submitted by Dale. They include two fine lanceheads, which are illustrated.

Dale, inspired by the interest he had created in London, now began to publish under the Greek letter " Δ ". In his first paper he records the presence of pottery at various sites, with bored stones and flaked tools (1870A). He mentions known sites in the Albany district and near East London, at the mouth of the Great Fish River (Bowker's site), ■ the Cape Flats, at Panmure, St. John's (Kabusi), Tembani, on the West bank of the Nahoon, and between the Nahoon and Geneka River mouths, also at Cape Henderson, on the Buffelidoorn Flats near Queenstown and ■ on. He illustrates two Still Bay lanceheads and two implements which suggest the Howieson's Poort series, together with ■ few nondescript flakes, all from the Cape Flats. This is the first instance in which stone implements were printed in a South African journal.

Dale goes on to say that the "Rev. Mr. Kronlein of Beersheba informs me that the implements are familiar amongst the Hottentots . . . from Wupperthal I hear that the oval perforated stones were used by the old Hottentot warriors ■ weapons of war, a stick of hard wood being thrust into the hole. For digging up roots the stone was grasped in the hand, the end of the stick being sharpened for picking up the ground."

Later in the same year Dale (1870B) states that Mr. W. C. Palgrave has submitted an arrow then in use by the

natives of the northern border of the Cape Colony. "The construction of it is highly interesting as a key to the method of fixing stone arrow-tips in the shaft. The workmanship is wonderfully neat and effective. . . . The shaft consists of two lengths of fine reed, between which (for strength and weight) is socketed in a bone of three inches in length. The joints are firmly secured by tightly bound strips of the sinews of animals. Into the end of the reed-shaft is inserted a small, leaf-shaped arrowhead of quartz crystal. The fissure is narrow, and the arrowhead, excepting the very tip and edges, is embedded in a fine cement, apparently of clay and evidently dressed with some poisonous matter. The stone arrowhead is sharp at the edges and the point. A horn is spliced on about an inch from the arrowhead."¹

Dale's paper goes on to mention stone arrowheads and flakes from Stephenson's Drift, ■ the Orange River, lying on the undisturbed surface, along the terraced ridges of the river bank.

Alfred Brown (1870) (known somewhat familiarly as Gogga Brown) of Aliwal North adds a note in which he discusses sites in his ■ general area. "About ten miles south of Koesberg, lately Bushuli's country, is an extensive plain, intersected by a valley nearly five miles in length and five hundred yards in width, which is the site of a very interesting series of ancient mounds or refuse heaps." These lie in shelters under the overhanging sandstone, and the deposits ■■■■■ from two to eight feet in thickness, and were at that time protected against erosion by grass. Implements, ashes, charred wood and partly fossilised bone were recovered. The walls are covered with paintings. "The unicorn (presumably the Rhinoceros) and other animals no longer existing in these parts are carefully indicated by those rude artists. In ■ recent paintings are Europeans in an unknown style of dress, drawn of much larger proportions than the other human figures: one of them, with clearly indicated European features, armed with a peculiar curved sabre, is marching at the head of a number of men in the attitude of attack. The walls of

¹ Cf. also Goodwin, 1945, where a Bushman description ■ the making of ■ arrow is given, together with illustrations of arrows of these general types.

the caves have undergone great disintegration." In Aliwal North itself he associates a well-marked section of a spearhead with the bones of the Aardvark (*Orycteropus Capensis*) and various ruminants. He notes implements and pottery in caves in the Stormberg.

In the following year Langham Dale (1871), speaking through George Busk once again, submitted a paper to the newly formed Anthropological Institute. It describes material found by himself on the Cape Flats (presumably near his home at Maitland) and by George McKay in the East London area. He speaks of pointed, spear-shaped flakes, and describes a polished celt; though he fails to illustrate or locate the specimen (but — Gooch, 1881). He deals in an even cursory fashion with a "spearhead with shaft" found on the Cape Flats. The Rev. W. F. Wood, in the discussion that followed, refused to believe that bored stones were employed for two purposes, and Dale replies: "It — to be acknowledged that a stick was forced into the perforated stone, and so was used by the old Hottentot warriors as a weapon in time of war, and also as a tool to dig roots in time of peace: for these uses I have the direct testimony of the missionary at Wupperthal, in the Cianwilliam division, and of others." Dale gives the following localities, some of which he has touched on in the earlier paper: Buffalo River mouth, East London; and the west bank of the Nahoon, 10 miles inland; Cape Henderson; Kliprivierspruit (Albert); between Queenstown and Dordrecht; Lower Albany district; the Great Fish River mouth; and a drift on the Orange River, probably Stephenson's Drift.

Early Geologists

C. L. Griesbach (1871), the geologist, mentions in a footnote that he "has seen implements of early — obtained by Richard Thornton and others in old raised beaches in Natal, near Inanda, and at the mouth of the Zambesi River." This seems to be the first reference to changes in sea-level, though Stow at about the same time refers to earlier changes of this nature, mainly older raised beaches.

This question of raised beaches seems to have been "in the air" at that time. The controversy started by Barrow

(1801) and continued by Lichtenstein (1810) now passes through the hands of the amazing savant, Dr. Atherstone. Following ■ visit to the Mossel Bay Cave, at Cape St. Blaize, he writes to the Cape Monthly Magazine suggesting that the deposits of shell are man-made midden refuse. The Editor disagrees, and suggests that they are ■ likely to have been wave-cut caves, filled with sea-débris, into which skeletons may subsequently have been buried. "S.T." in ■ later article sides with Atherstone and adds Mark Twain's comments on the shell middens of Smyrna. Later in the same volume "F" (who, like "S.T.", still remains anonymous) sides firmly with the editor, and states somewhat mendaciously that the floor of the cave "is precisely the same as that of the beach below, with a thin carpet of decayed animal matter, but no bones, coal or ash." He therefore avers that this is a relic of recent uplift along the coast. "It is quite a pleasure to catch the genial and usually careful Doctor thus tripping. I suppose he wrote from memory, and not from present observation." The reply to this very careless observation ■ to come later, from the pen of George Leith (1898), who excavated portion of the cave at the instigation of Kanne-meyer.³

P. D. Martin's paper in the following year (1872) is mainly interesting ■ it inspired Péringuey over forty years later. Martin's paper deals with bored stones from Noord-hoek, and ■ example from Agulhas "a trifle larger than a large walnut." Speaking of the lower grindstones he has studied he suggests four uses, grinding clay for pottery, bruising and rubbing down roots for the extraction of arrow poisons, for polishing and sharpening stone weapons (though he has the grace to add that "among all the splints I have seen, none had the least sign of grinding or polishing") and finally he suggests that "these stones ■ used for cooking, and that the epicures among the natives may have had theirs indented to ■ the gravy." J. H. Bowker adds a note ■ the distribution of bored stones as digging-stick weights and dagga-pipes, and gives ■ general account of midden deposits.

³ See also Comrie, 1874.

He is the first to mention the use of glass (when obtainable) in place of quartz crystal by the Kalahari Bushmen.

The diamond rush on the Vaal River had begun by now, and geologists were searching the Vaal gravels for evidence of various kinds. G. W. Stow (1872) notes the presence of ostrich eggshell beads at du Toit's Pan, and J. Shaw in the ■ volume is the first to suggest that the Vaal River gravel deposits are the result of the consecutive breaking down of ■ series of lakes held behind barriers.

Apart from a slight paper by Dr. Comrie attributing the shell deposits in the Cape Point caves to man (apparently read previously before the New Zealand Institute, unless the reference refers to a South African archaeological paper by B. H. Darnell, read before that Society in 1873), there is little of historical value in the next few years.

John Sanderson (1878) exhibited implements found "in, or in the vicinity of, the town of Durban," before the Anthropological Institute. The paper is of little interest, but it reports the first findings from Natal, save for Griesbach's undescribed material from raised beaches. Sanderson was obviously associated later with Gooch. He observes that "Stone implements have been obtained everywhere in excavations, from the Red Hill to the Great Umhlanga in Victoria County, and also at Pinetown, Thornville, Maritzburg and at Estcourt in Weenen County."

The South African Philosophical Society (parent to the Royal Society of South Africa) now began publication, and Mr. W. Prosser suggested that an Ethnological Section of the Society be started, "to devote itself to the preservation of Bushmen relics and other Bushmen remains." The Society did eventually get ■ far as to receive ■ "Report of the Secretary of the Ethnological Section," from Calcott M. Stevens, in July 1879, but as there was no response to the circular sent to likely persons throughout the Colony, the matter ■ then dropped. In September 1897, Sir Thomas Muir refers to the matter once again in his presidential address. More recent efforts to develop a humanistic side to the Royal Society of South Africa, separated from the purely scientific and naturalistic aspects, have similarly failed.

E. J. Dunn

E. J. Dunn exhibited a collection of stone implements before the South African Philosophical Society in 1878, and two years later (1880) his account was published in full, though with several misprints. The paper is comprehensive, and mentions sites at a large number of places. These include Du Toit's Pan, Kimberley; the Cape Peninsula; Procesfontein, Victoria West; in the Stormberg, and so on. This is a typical collector's paper, and had he taken more trouble to describe exactly, and to give greater detail as to geological deposits, Dunn could have laid a firm foundation for South African prehistory. He covers many types, such as bored stones, grinders, lance-heads, points, scrapers, arrow straighteners and so on, making this a paper with a great historical value. Among his more important sites we can mention Later and Middle Stone Age material from Klaver Vlei, Nauta, Leeuklip, Kloppersfontein (between Queenstown and Molteno), Oshoek farm in the Camdeboo; Salt River, Claremont, Oaklands, Constantia, Devil's Peak on the Cape Peninsula; Queenstown Hospital; Buffelarivier (Beaufort West), and so on.

Earlier Stone Age sites he records from Oorlogs Kloof (Stormberg), the junction of the Queenstown-Molteno Road, and Maynard's Hoek, Camdeboo. Bored stones and their borers are recorded from Weltevreden (Stormberg Spruit), from Kust, Langefontein and van der Walt's Kloof, all in the Camdeboo, and from Klipfontein, Stormberg, and Schietfontein in the Graaff-Reinet area. His description of the method of making a Bushman arrow, as given by him from Leek River (Zakrivier) on the word of an old Bushwoman, is a classic.⁴ He is also the first to describe the use of long-pointed stones from the Kiljan Veldt (Kaaienveld) for use as rimers in the making of bored stones.

Dunn left South Africa a few years later, and took his entire collection with him to Australia. Several publications have followed from his pen, but all of them necessarily date from his period of sojourn in South Africa. A short catalogue of the material presented to the Victoria Museum, Australia,

⁴ Cf. Goodwin, S. Afr. Journal of Science, 1944.

was followed many years later by "The Bushman" (1931). In this volume he divides stone implements into three main groups, pre-Bushman, Bushman and Bantu. Of these the second is the most inclusive. The book provides one of the best illustrated works we have on prehistoric archaeology, though it is of no very great use typologically or from the viewpoint of the study of a representative series from a single site. In 1937, fifty years after leaving South Africa in 1886, he stages a return to this field through a final paper, adjudicating from photographs what are, and what are not, in the opinion of his memory, true Bushman and true Hottentots.

Thomas Bain (1880) describes the material found by him in the "bone caves" at Knysna, and includes "the shoulder blade of a lion, with paintings on it." This specimen is lost, but presumably provides a link with the curious burial-stones so frequent in the close vicinity of Plettenberg Bay a few miles to the east. Much of Bains's work was undertaken in collaboration with A. W. Robinson, whose collection is still intact, and is far better documented than anything done by Bain in the Knysna area.

SCIENTIFIC CLASSIFICATION

No attempt had so far been made to divide the archaeological period in South Africa in any way. This is partly due to the "collecting phase" through which our savants were passing, and in part to the absence of any clear differentiation between periods in the European field. Prehistory — inchoate as a subject, and only beginning to feel its way without the essential help provided by both geology and ethnology, two subjects which had advanced very considerably by this time. It must be appreciated that, though E. Lartet had drawn up some sort of chronological classification of European cultures, his work was never completely accepted in its original form, and it — only after a long period of digestion and cross-checking that Gabriel de Mortillet finally produced a generally acceptable classification for France in 1881. Even this was later modified by J. Déchelette in 1908 (producing a split in the ranks of French archaeologists), and within recent years it has been further modified and considerably augmented by the Abbé Henri Breuil. It is therefore some-

what amazing to realise that in the same year that Gabriel de Mortillet completed his self-imposed task, the first workable classification of South African cultures was published. This is a product of the pen of J. C. Rickard and takes the form of two papers submitted to the Cambridge Antiquarian Society on November 29, 1880, and March 14, 1881.

Rickard's thesis was communicated by A. F. Griffith, and is based upon four "series" of Palaeolithic implements from South Africa, collected by Rickard and presumably sent over to Cambridge with appropriate notes. The illustrations are somewhat crude. The material is divided into three: Palaeolithic, Neolithic and Historic; the cultures are "groups" do not appear to have any chronological significance within the three broad periods:

- | | |
|----------------|--|
| Historic : | Bushman caves and rock-shelters. Pottery and paintings. Late Kitchen middens. No cutting implements of stone. Rubbers, grinders, bone pins, beads and ornamented pottery, etc. |
| Neolithic : | Early Kitchen middens. Pottery absent or scarce. Cape Flats deposits. Implements of vastly superior workmanship. Pottery and fauna unknown. |
| Palaeolithic : | Port Elizabeth Group. Fauna unknown. East London Group. Fauna unknown. |

Rickard then goes on to describe various sites. At the Riet-Modder River junction, in the bed of the river immediately below the confluence, or in small hollows containing a little coarse gravel, he collected upwards of eighty specimens of *coups-de-poing* in a few hours. (Possibly this would be Fauresmith material.) At Port Elizabeth he found *coups-de-poing* in two depressions on the Donkin hill, and "formed an opinion of the great age of these specimens independently of their singular resemblance to European implements." Further down the slope he found other material "amongst the naturally formed débris on the slope of the hill, some 60 or 70 feet above sea-level, a few in the Main Street of Port Elizabeth, and one under hard limestone, covering what is probably an old sea-beach."

At East London his material comes from "a spot close to the town, which was until recent years covered with drift-

sand to a depth of six — eight feet: this has now been removed, so that at present the surface consists of a blackish sandy clay. Towards the lower part of this layer, which is from one to three feet thick, the implements were found. . . . At about 150 or 200 feet higher elevation than the East London side (on the opposite side of the river) the same layer occurs containing similar implements." Griffith, in commenting on Rickard's notes, states that "there — two somewhat similar in general appearance, to ordinary pointed implements, but they have had the point replaced by square chisel-ends." Obviously the first definite recognition of the *biseau* type. He goes on to compare these with Madras, Spanish and Toulouse specimens. The illustrations show Stellenbosch affinities (the Main Street, Port Elizabeth series, is not illustrated). From Bultfontein diamond mine, three miles south-east of Kimberley, a good Stellenbosch type is illustrated, while — example from Pandamfontein, du Toit's Pan, may be Faure-smith or late Stellenbosch.

The second paper, which follows directly — the first, covers Earlier and Later Kitchen Middens, his Cape Flats period, and the Bushman period. The Earlier Kitchen Middens, containing shells of existing sea fauna, stand at 15 to 20 feet above sea-level. From Port Elizabeth he describes bored stones in association with midden material at North End and other sites. Pottery is scarce or absent. The Later Kitchen Midden material includes hammers and rubbers, a few large animal bones. A small bored stone comes from — East London midden. Pottery is associated.

He apparently had no personal contact with the Cape Peninsula, and his references to Cape Flats deposits consist merely of a short bibliography, from which he draws no conclusions. This includes publications already touched on here. Rickard is the first writer to have shown any interest in the stone huts at Bethulie, on which he adds a short note. These, of course, are Bantu, but late prehistoric.

W. D. Gooch

Following closely upon Rickard's paper, and inspired by a greater personal knowledge of sites, comes an important contribution by W. D. Gooch. This railway engineer had

helped in laying out parts of the railway system of Czarist Russia, and in the previous year he had published one of the earliest papers on the stone age in Russia. After completing work on a section of the Trans-Siberian Railway he was seconded to South Africa to design parts of the Natal Government Railway. This gave him access to new sites, revealed by the necessary railway cuttings, but he pays tribute to the various local authorities, museums and amateurs, who gave him additional information. Among these was John Sanderson (1878) whose paper presumably predates Gooch's work here.

Zoning

Gooch (1881) — the first writer to realise the necessity for some system of zoning in South Africa. His system is by no means complete, and is mainly of historic interest. We deal with it in discussing various suggestions for zoning in a later chapter. From his descriptions, many of Gooch's implements and ornaments may be unique, as in addition to the common pierced shells, ostrich eggshell beads and a stone armring (bladed disc) from Camperdown, Natal, he speaks of a rosette of amethyst quartz, toe and finger rings of indurated shale, and ear ornaments. He describes and illustrates a bladed disc ("war-club") from Red Hill railway cutting, Victoria County. With bitterness he states that Bleek, Bowker and himself have all sought a Bushman capable of making a bored stone, without result, whereas Dunn proved more successful. The obvious reply to this is that Dunn turned to the Bushwomen, and not to the men, for his information on the woman's digging-stone. Gooch gives three broad types of bored stone: the globular (5-7 lbs.), the cylindrical, and the small globular (2 lbs.). These occur specifically at Kalk Bay, and are widely distributed throughout the country elsewhere. One important point is that Gooch saw Layard's "celt"⁵ and states quite definitely that this specimen from the Tulbagh district is of natural origin, not artificial. This evidence is all the more important as simply made celts of Neolithic type occur at Piquetberg⁶, and Layard's original appears to be lost.

⁵ See Dale, 1871.

⁶ Goodwin, 1929.

Gooch illustrates *coups-de-poing* from Natal, which "approach the oval palaeolithic type of Europe, and occur in the oldest deposits in which I have noticed implements in Natal." Describing what would now be regarded as Middle Stone Age types, he speaks of "javelins" from the Cape Flats, the Eastern Province and from Natal. These he divides into Neolithic and Palaeolithic.

In dealing with the types of deposit from which implements are recovered, he notes that caves had at that time received little attention, and the only instance in which a cave had been excavated, to his knowledge, was J. H. Bowker's excavation in Basutoland. The contents were sent to Sir Joseph Hooker (then director of Kew Gardens, London) and Gooch quotes a letter from Bowker to Hooker, dated 28th July, 1870. This is interesting, as Bowker (1884) himself only speaks of having sent specimens from this dig to the South African Museum and to Sir Charles Lyell, the geologist.

Kitchen midden deposits described by Gooch include sites at Simonstown, Cape Point, and the Natal coast. Alluvial sites — noted on Durban Flats, Avoca, a few miles to the north, and Pinetown, all in Natal. In the Cape Colony he speaks of similar deposits near East London and at Cambridge, and on the Cape Flats. Humus sites occur in the Free State, along the Drakensberg, and at Umzinto, and Smerdon's Flats, Durban, all in Natal. In conclusion he gives an account of the materials used by early man in the making of his tools. While it is obvious that many of these sites were shown to Gooch by local workers such — Sanderson, he appears to have obtained a good grip of his subject, and to have — the necessity for dealing somewhat differently with separate areas such as Natal and the Free State.

H. W. Feilden (1883) describes various sites at Rustenburg, Transvaal, at Newcastle, Natal, in Zululand, and from Bushman's River, Estcourt, from Pietermaritzburg and shelters in the Drakensberg. In the Newcastle district he found two "spearheads" (a term often used at that time for *coups-de-poing*), and two "arrowheads" with a bored stone from depths of twenty feet in dongas cut below the mountains

proper. Between Newcastle and Rorke's Drift he found implements in "concretionary limestone marls."

Feilden again sheds light on the ultimate distribution of J. H. Bowker's collection, as he states quite definitely that the latter presented his material from middens at the mouth of the Great Fish River to the Royal Artillery Museum housed in the Rotunda, Greenwich, in 1866. He goes on to shed some light on the — of glass implements.⁷

It will be seen that the opinion of workers in South Africa was tending more and more to the belief that stone implements belonged to dates broadly comparable to the European series, but opinion among the savants in Britain seems to have resented any such possibility. Their objection was clearly based on the fact that implements of early palaeolithic type can be found on the surface in South Africa, ignoring the abundant evidence of material found at depth. It is therefore salutary to find that W. H. Penning (1880), a geologist, points out that the essential differences between the mode of occurrence of implements in Europe and in Africa, do not imply that European paleolithic implements — necessarily older than their African equivalents. Penning goes on to describe implements from Pretoria, made from material from the quartzite beds of the Magaliesberg, and quartzite tools from Ohrigstad, together with chalcedony material from the Vaal River. The discussion following his paper contains some curious remarks, which are adequately dealt with elsewhere.⁸

Dr. Daniel Kannemeyer

On the upper reaches of the Orange River, the area covered by such — as Aliwal North, Smithfield and Burghersdorp, two interesting savants — undertaking keen amateur work on the local deposits, paintings and the remnants of the Bushmen. Dr. Alfred Brown⁹ and Dr. Daniel Kannemeyer seem to have worked together as a team, exchanging ideas and material from time to time. One curious result of this association lies in the persistent manner in which

⁷ Quoted more fully in Goodwin, 1935.

⁸ Goodwin, 1935.

⁹ Whose life has been briefly recorded by Prof. M. R. Drennan, "Gogga Brown". Cape Town, 1938.

Brown collected Middle Stone Age types, while Kannemeyer confined himself to Later Stone Age materials. There would appear to be no valid reason for this prejudice, but it has led to the term "Smithfield" being taken to commemorate the work of Kannemeyer, which is almost exclusively related to that series. Alfred Brown (apart from a short note under the initials "A.B." (1870) to Dale's paper) — never to have published, but kept voluminous diaries covering his finds of archaeological, palaeontological and zoological materials. Kannemeyer (1890) seems only to have published once, though he carried on a correspondence with the British Museum, and with the South African Museum, Cape Town, that deserves some form of publication.

The full title of this paper, published in the now rare "Cape Illustrated Magazine" for 1890, is "Stone implements, with a description of Bushman stone implements and relics, their names, uses, mode of manufacture and occurrence." His remarks are confined to the Albert district, though he points out that "from Cape Point to the north Kalahari, from the desert coast of the Atlantic to the forest-clad slopes of the Indian Ocean, stone implements are to be found, if they are looked for properly." He discusses caves under sandstone ledges, overlying soft and friable shales, along the Stormberg Range, and the smaller shelters that occur in the 'Ko-onas or lesser mountains and hills of the upper Karroo beds. The Bushman name for these shelters is given as '*skaga skoign*, and the associated springs of permanent fountains he calls '*tsago*. All these spots are rich in implements, and the caves have been rendered more fertile by the accumulations of midden they hold, so that the soil is held in place by the roots of bushes.

He suggests that it was the encroachment of higher races that forced the Bushmen to the caves from the open lands, which at one time were thickly populated by them. "This is proved by the implements found at these exposed localities being older than those found on the surface, near the caves. They are more deeply oxidised and weather-worn."

He gives the Bushman name of the Orange River as '*ikoege*, and the lesser tributaries he describes as '*ikatoe*. Water is '*thanga*, trap-hillocks are '*tho'koring* and the Bush-

man himself is '*tskan*'. As Kannemeyer certainly met various Bushmen and Hottentots in his childhood, and later in his capacity ■ the local Medical Officer of Health, some reliance can be placed upon his vocabulary, though the orthography is his own, so that various clicks ■ represented by 'z, 'tš, 'tsk, etc.

He discusses Bushman art, telling how the pigment (*Qerrin*) was made from charcoal and differently coloured ochres and clays, which were mixed with the marrow (*tsuis*) of the eland (*tghaa*), to produce ■ durable paint. Superposition, petroglyphs and the material depicted, are all touched upon. The author adds a point of interest when he suggests that in former days the Bushmen were far less nomadic, as game (*twaing*) ■ more plentiful and intruding races less antagonistic.

The most abundant stone implements are the wrought flakes (*kuin*) for skinning game. This, from a letter to Péringuey, is certainly the Smithfield endscraper, as appears from a verbal description in this paper. He touches ■ the presence of unworked points, obviously similar to the examples collected by Alfred Brown in the Aliwal North district, contrasting these with the worked points of the Cape Flats.

After discussing the existence of stone-tipped arrows elsewhere, he goes on to say, "The Bushmen in these parts for a long period back have substituted bone, the barbs in many cases consisting of minute flakes of quartz or onyx, or ■ strips of vulture quill, set at right angles and attached low down ■ the bony part of the shaft, the threads of sinew used to secure them are thickly coated with arrow poison."

Bored stones, on which he has much to say, he calls *ka 'ka 'kourie*, and it is either from this form, or from a mis-reading of the word *kiri* in a letter to Péringuey, that the latter gets his name '*kwe*', which has passed into current usage overseas, though with little foundation. Kannemeyer played with bored stones from his earliest years, and in all probability much of his information comes from early tales told him by Bushman herdsmen. "These perforated stones ■ used by the women to weight the '*cibi*' or sharp-pointed fire-hardened stakes employed in digging '*taauwing*' ■ bulbs, and '*taau 'tke 'shaubitse*' or termite larvae. They were secured

by one or two wedges, ■ rested on a bulge left in the middle or upper part of the stick." These termite larvae were then placed on the 'tkhatsge or small reed mat, and sifted from the sand to form "Bushman rice." It is this paper that starts the legend of small bored stones for Bushman children and larger ones for adults, as a counter-theory to Bowker's suggestion that they were used as knobkerries as well as for digging. He continues with a description of their ■ facture.

The ■ he ascribes to grindstones include "the pounding and mixing of unguents and pigments for personal decoration or for rock-paintings, for grinding down wild grass seeds, bulbs and scalded termite larvae and locusts, for breaking up grass culms and incorporating them in the clay used for pottery. The smaller ones were used for compounding the 'tgaigu or poison, and working it into a tenacious mass." He lists locally used poisons so prepared.

Flat oblong stones ('thagun 'kowie) were used as arrow-stones, and when heated, they served to straighten the reed shafts of the ■ ('thangu) and to polish the 'skono or bone arrowheads, formed from the fibula of the ostrich. Stone hammers, for crushing marrow-bones or for trimming various stone implements are common. Bone implements, wooden pegs found jammed in the rock crevices of caves, and other minor points are touched upon.

He comments on the presence of a large number of spindle-shaped grooves at many of the caves, reputed to be used for sharpening and polishing bone arrow-points. Some, however, are several feet long, and broad and deep enough to admit the thumb, while others are mere scratches which would not hold a needle. He can produce no explanation of this phenomenon. Another puzzling point is the presence of smooth round balls, sometimes roughened by coarse chipping. There ■ ■ reason to believe that these were intended for perforation, and in this ■ they are always of the ■ black metamorphosed shale. These were probably Middle Stone Age specimens.

Broken potsherds ('kwa) were frequent; and Kannemeyer speaks of pots frequently found intact in the mud of springs. He notices, too, the frequent occurrence of grass culms in the

potclay, which seems typical of Smithfield pottery, in contrast to the coastal (and generally Wilton) forms. Fragments of ostrich eggshell (*tebbi 'tebts'e*) occur, remnants from eggs used ■ waterpots, eventually to be used for beadmaking.

He points out that many springs in this area were closed by the Bushmen and that worked stones are to be found in the "eye" of almost any spring. Sometimes these are bored stones, sometimes not. He supposes that, as springs were recognised property, they would provide safe places for storing implements if the owners were forced by immigrant ■ to leave the country. He suggests too that the stopping up of fountains was partly intended to deter settlers from staying permanently ■ the country. The marks of incoming Europeans ■ best judged from the frequency of leaden bullets and bullet ricochet marks in Bushman caves. These speak eloquently enough for themselves.

I have quoted Kannemeyer somewhat fully, as his original paper is not easily available. One of the rare survivals of the Cape Illustrated Magazine has had this section removed, presumably by ■ amateur antiquarian whose personal acquisitiveness outweighed his own debt to the future of his subject. It might prove worth while at some future date to republish this paper; not so much for its exact scientific interest, but because of its educational value.

Dr. Louis Péringuery

It is at this time that Dr. Louis Péringuery, an entomologist brought to South Africa from France to investigate diseases in South African grapes, first became interested in archaeology. The first recorded note is a short statement in the minutes of the South African Philosophical Society, for January 29, 1890, which states baldly that "The President exhibited a possible weapon of singular shape—hatchet shape ■ which had been found on the beach at Simonstown." Two years later, having received ■ hafted stone implement from Mr. R. E. Dumbleton, he exhibited this before the same Society, and R. Marloth, D. R. Kannemeyer and H. Bolus asked if they might analyse the gum by which the tool was attached to its stick. Marloth (1892) reported that it consisted of a fine resin with chalk, and included starch grains identified by him as from wheat and rice. How far such an

identification took into consideration the forms of starch yielded by wild grasses or roots, it is difficult to say.

Through the following years Péringuey's fame rests mainly upon some twenty-five short notes, seldom more than three lines in length, of announcements made at meetings. Few of these comments are of real value, but they might be built upon into an interesting commentary upon the acquisitions made by the South African Museum through those years. Our greatest debt to Dr. Péringuey is for the way he made this subject live among the amateurs along the south coast of the Colony; much material would certainly have been lost if it had not been for his careful scrutiny of everything that came to hand. His greatest fault as a museum director lay in his tendency to keep important and interesting specimens in the drawers of his desk, relying upon his excellent memory to supply the provenance. Unhappily his memory died with him. It would be unnecessary to touch upon the great number of short notes of Péringuey's exhibits. These were read before the South African Philosophical Society at Cape Town, and later before the Royal Society of South Africa, which (with Péringuey's help) grew out of that parent of so many of our scientific societies. If a full list is wanted it can be found in the Commentary and Bibliography (quoted in the introduction) where his publications have unhappily been placed under the name of W. H. Penning, by an error in the page-proof, which ■■■ not present in the galley-proof.

Dr. S. Schönland (1894) of Grahamstown also enters the field at about this time, giving ■■■ account of ■ series of skulls, ■■■ of which, the Zwartkops skull, ■■■ found "in the sand-hills south of the Zwartkops River mouth, some twelve feet above high-water mark on the coast of Algoa Bay." Mr. Leslie, who made the discovery, adds that it was associated with shells, fish, bird and mammalian bones. The ■■■ midden yielded bits of pottery and implements. The skull is clearly from a late midden, and Schönland identifies it as having Hottentot affinities.

In the Eastern Province, too, G. R. MacKay (1897) produces his third paper under the somewhat surprising title "Evidence on the antiquity of man in East London, Cape Colony, with a note on the castor-oil plant." He mentions

middens with pottery found by him as early as 1857 on the left bank of the Quigney River, at its junction with the Buffalo River, East London. His other remarks concern material from a cutting "behind the new jail," ■ bored stone associated with hippopotamus teeth, and the discovery of "Moustier types" in stratified calcareous sandstone at Cove Rock and at Bat's Cave, which he believes must have been covered originally by 180 foot of deposits.

Rupert Jones (1898) describes and illustrates implements submitted to him from Swaziland by Mr. S. Ryan. These had been found near Darktown, in the tin-beating gravels of Mbabane. Thirteen *coups-de-poing* were found in the gravels of the hillside above the river, and some, in gravels derived from these, in the present bed of the river.

Mr. Minett Frames (1898) describes some implements (apparently Smithfield N. from the illustrations) from the farm Curragh, near the Umdowaan River on the Natal-Griqualand West border in the Drakensberg. Paintings on the wall of the cave show eight eland, and a crude elephant in dark and light red. The cave has since been inhabited by Basuto, who threw much of the deposit out. Some of the implements have been re-chipped, and some are waterworn.

George Leith

Dr. Daniel Kannemeyer was the inspirer of Leith (1898) and his interest in prehistory. Leith ■ an exact observer of things archaeological. Kannemeyer first introduced him to the krantz above Burghersdorp village that he loved so well. Here they looked at the paintings and searched the hillside for implements. It ■ to have been at the instigation of Kannemeyer that Leith visited and excavated the Mossel Bay cave, in order to vindicate the views expressed many years before by Dr. Atherstone, views so rudely laughed to scorn by the anonymous "F" in the Cape Monthly Magazine.

This paper is important, considering the time at which it was written, and covers ■ wide field, divided by the writer into seven sections, viz. :

- i. Caves of the Stormberg, Burghersdorp.
- ii. Caves of Mossel Bay: Cape St. Blaize, Bland's cave and a shelter.
- iii. Caves of East London: Bats' cave, and remains of ■ old cave floor.

- iv. Kitchen middens — the South Coast.
- v. Large stone implements from behind Cape St. Blaize.
- vi. Stone implements from the Transvaal: gravels near Pretoria, brickearths, higher gravels, and from the Aapies River below Pretoria.
- vii. Implements from the Springbok Flats, and special implements.

Of these probably the most important sections are those dealing with his trench cut in the deposit of the cave at Mossel Bay¹⁰ and the material from various Pretoria gravels.¹¹ Many of these latter he regards — "Harrisonian eoliths." The Stormberg caves are only broadly described, and this section of his paper has no value to us whatsoever.

After finding the original material from which the Mossel Bay culture is named in the deposits underlying midden in the Cape St. Blaize cave, he turns to Bland's cave (more generally known as the Guano cave). He found three Hottentots digging for guano in a deposit which had been sifted and resifted even at that time. Marks on the cave wall showed that the original level of the deposit must have been as much as twenty feet higher in places than the level at which the diggers were working. In the muddled siftings of the floor he recovered a few chips of stone, but nothing of interest. He did note, however, that the only remnants of undisturbed soil consisted of "a deposit from 12 to 18 inches thick, of damp black earth. Here and there in it were bones, to all appearances the leg-bones of ruminants, but so rotted that they crumbled on being touched. The deposit — just above sea-level, and this might account for the dampness which is usually quite absent in other coast caves." His section in another cave near by, and towards the Gouritz River, proved disappointing.

From his description, he was the first to observe and describe the Golf Course site at Mossel Bay, where he found large, rude implements in quartzite, generally similar to examples (described later in the same paper) from Pretoria. Presumably this was Stellenbosch material, which was at one time abundant — this site.

In the East London area he was disappointed in Bats' cave, but did find what he describes as the cemented floor of another cave, of which the overhang had disappeared.

¹⁰ Cf. Goodwin and Malan (1935).

¹¹ Cf. van Hoepen (1920).

Whether his description is correct, or whether this is a cemented midden or a fragment of raised beach, I do not know. "I noticed that besides pebbles there were periwinkles and oyster shells projecting from the surface, and not only these but plenty of chips and some well formed flake implements. I found myself looking, in fact, at a mass weighing — hundreds of tons, which was neither more nor less than cemented cave-deposit."

Midden sites are noted at Port Alfred and Port Elizabeth, and he attributes those middens containing no implements to inland Hottentots who visited the coast from time to time to enjoy the shellfish.

The Pretoria implements seem mainly to have come from gravel deposits 200 feet above present stream level. These are typified by "brown, shiny patina so marked that I have been able to recognise the deposit at a distance of several hundred yards." The few illustrations, all "Harrisonian colitha," are from the Springbok Flats, Muckleneuk, the Camp gravels near the old railway station at Pretoria, and from Daspoot.

Speaking of the Springbok Flats, Leith says: "As a matter of fact, these Flats are sown thick with flake implements. Go wherever you like, you come across them. You find implements made from the local rocks, or chipped from the agate chalcedony and jasper pebbles that abound there. Rarely or never is a perfect implement found."

The original paper was copiously illustrated, and his references to the plates are somewhat tantalising, as only views of four specimens are reproduced. It is not possible to trace prints from his original photographic plates, though these — kept for some time at the Anthropological Institute.

Proofs of Age

Readers will have realised by now that proof of the great antiquity of South African prehistoric periods had been forthcoming from the evidence of various reliable investigators long before this time, but the difficulty seems to have been to convince scientists overseas that this could be true. Why the prejudice existed it is difficult to say, but it is paralleled to-day by the way in which scientists in Europe and elsewhere are only willing to accept the statements of visitors with a brief knowledge of the country, rather than to

augment these with the detailed work of those who know South Africa and local conditions, and have a knowledge of hundreds of sites over a period of years.

W. H. Penning (1896, 1898 and 1901) obtained a *coup-de-poing* from the bottom of a well "sunk through four or five feet of limestone at the foot of Ooquaan Hill in the Kalahari Desert." A slightly more detailed report is given in Penning's book "Gold and Diamonds" (1901), where he mentions deposits seventy feet above the Buffalo River mouth, and sites at Kimberley, Barkly West, Koffiefontein, Jagersfontein, Pretoria, Orighstad, Kaap valley (Drakensberg), the Crocodile valley, Heidelberg (Transvaal), the Witwatersrand, Middelburg (Transvaal) and the Ockwane specimen.

Péringuay's next important contribution is, as usual, short (1899). "Mr. L. Péringuay showed some stone implements found at Stellenbosch and Paarl, which he considers the oldest types yet found in South Africa." This was followed in the next year by a similarly brief note by Péringuay and Corstorphine (1900) on the same sites. This announcement of implements from Bosman's Crossing (a few hundred yards south of Stellenbosch railway station) and sites near Malmesbury and Paarl was reported in "Nature", and perhaps for that _____ came to be accepted as sufficiently weighty to confirm the possibility that implements in South Africa were of a date equivalent with the oldest conventionalised tools in Europe. Péringuay regards these tools as Palaeolithic, but Corstorphine and Colonel Feilden are _____ cautious; the former "finds difficulty in accepting this theory owing to the geological deposits in which the stones were found. So far no implements have been found in any deposit that can be regarded as of great antiquity." However, this Bosman's Crossing site has become the name-site of the Stellenbosch culture, even if later investigation should prove the need for the development of several regional type-sites for this widespread and complicated culture.

With the turn of the century research was becoming more and more localised. Workers concentrated upon more limited areas, or at least divided their contributions on different sites between two or more papers. Thus we seldom get reports (such as Leith's) which jump from the excavation of a coastal cave to Eolithic gravels far inland.

PART II

ZONING

It is the localised survey that should provide the background of our science in the future, and central authorities must be content to make use of such surveys, and at the same time to take account of the needs of the local worker. Material which is essential locally for purposes of comparison, study and analysis, must be kept locally available. One can well imagine the complete collapse of amateur prehistory in (let us say) Britain if all comparative material from those islands — to be centralised a thousand miles away in Prague — Vienna. In this country we have already suffered by the early tendency to ship material overseas to Britain, Switzerland and even Australia; many of these specimens would have provided useful comparative data if housed locally.

This problem of the fair and adequate distribution of material in this country is going to become more and more important, whether collections consist of art, tools — other relics of man's past. The rights of the field worker must be constantly envisaged, and essentials from — locality should necessarily be retained — a unit, protected by labelling, documentation and adequate housing, and maintained within reach of the area in which the survey was undertaken. The work of such men as J. P. Johnson has been rendered useless, — those few remnants of his collection that survived his death are scattered between half a dozen museums, without documentation. The belief that the "spoils go to the richest", — that any institution with sufficient monetary backing can go into the territory catered for by poorer institutions, and permanently remove comparative material — bad science, quite apart from creating ill-feeling and eventual withdrawal of brains and devotion from a field where they are needed. At present the law protects the country as a whole, but does not protect or support local museums adequately.

Various suggestions have been made as to how Southern Africa might best be divided into regions so as to include neighbouring territories. These — or zones should be fundamentally selected to accommodate both man and his cultures, and should therefore fit environmental conditions, the types of raw material available and the techniques and variants that — normal to the zone. The whole problem is a difficult one, more especially — the natural and cultural — varied through the ages. For instance, it is evident in the Earlier Stone Age that coarse grained rocks tend to dominate the techniques used by man. The Fauresmith period ushered in the use of indurated shales, and in the Middle Stone Age this was freely used with such materials as quartz, cherts and surface quartzites. In the Later Stone Age many of these persisted, but were again augmented by chalcedonies, agates and other semi-precious stones. It should be possible to keep our zones somewhat general, with boundaries not too clearly defined, — that these various types of stone will not affect the zoning more than would actually represent the facts.

It is not yet possible to choose between various systems, and none is complete in itself, but an adaptable system should be developed through the years, which will in time adjust itself to changing prehistoric conditions as they are found to have been. This is preferable to a system forced upon our subject, which would finally collapse as inappropriate. In evolving such a scheme — have certain laws to guide us. For instance, we know that under normal conditions — river basin provides a focus for an ethnic group, while mountains and arid regions — the natural boundaries of distribution. The unnatural use of rivers to provide "political" boundaries should be avoided, but the actual existence of such boundaries makes it difficult to break away from the system, especially if government — colonial departments are concerned, with powers only within their own limited territories.

W. D. Gooch first suggested (1881) subdividing southern Africa. He proposed five regions, not very clearly defined, and not covering the whole of the Union.

i. Cape: Cape Peninsula to Hottentots Holland and along the littoral to George.

2. Coastlands: The littoral from George to Zululand.
3. Berglands: Hottentots Holland (and other southern mountain ranges) to the Kwahlamba, including the Stormberg, etc.
4. Uplands: The Karroo and those regions lying above 1,000 ft. up to 2,000 ft. above sea-level.
5. Overberg: High elevations inland, bordered by the Berglands.

Nothing more seems to have come of this system, ■■■ was anything more suggested by later writers until just fifty years later, when Goodwin¹² pointed out the grave difficulties lying in the way of developing a general chronology for South Africa from knowledge of a particular ■■■ This is especially true of the Middle Stone Age, where varieties seem to be related fundamentally to available materials. He therefore suggested a basic division into a Southern Mountain Region (coinciding broadly with the winter rainfall area) and an Inland Region. On this almost purely climatic foundation would be imposed a pattern (based upon distribution maps) of zones appropriate to each Age. Thus we might have a Vaal Zone or ■ Griquatown Zone, suitable for Earlier Stone Age, which might not be adaptable to the Middle Stone Age, and ■■■ on. This was followed two years later by a more detailed discussion of the whole position,¹³ which ended by tentatively defining areas for the Middle Stone Age only. The five suggested areas, with slight modifications, are:

1. Plateau: Covering the Vaal and Orange basins and the interlying country, and including most of the Lydi-anite ■■■
2. Rhodesian: Southern Rhodesia, and also the Limpopo basin and Swaziland.
3. Eastern Zone: From Port Alfred to the Swaziland border (probably a zone of migration and contact) giving rise to conditions in the ■■■
4. Southern Mountain Zone: From Port Alfred to Saldanha and inland to the mountains bordering the Plateau Zone.
5. Western or Kalahari: An additional zone, insufficiently studied, covering South-West Africa, and the Kalahari, from the Plateau Zone to the West Coast.

¹² South African Journal of Science, 1931, XXVIII, pp. 61-62.
Presidential address. Section II.

¹³ Goodwin, 1933 B.

An analogous system of major regions, including minor — intended to cover the Later Stone Age, only still awaits publication.¹⁴ This is the first attempt to base a system of this sort upon purely archaeological evidence. The results relate themselves most remarkably with the broad environmental regions discernible to-day, as is to be expected for any system developed for the Later Stone Age. On the other hand it does not yet show any relationship to the cultural areas of prehistoric art, which are by no means adequately understood.

- I. Transvaal: Eastern, above, and as far — the edge of the Limpopo escarpment.
- Central, including the areas north of the Magaliesberg.
- Southern, including the Witwatersrand, but not the Vaal below Vereeniging.
- II. Natal: Highlands, as far as Mount Currie and to Swaziland broadly above 3,000 feet, but following the main rivers to a lower level.
- Lowlands, from 3,000 feet to the coast.
- III. Upper Vaal: Schoonspruit-Vaal. Vet-Marico. Bloemfontein-Sepani. Vaal-Harts basin.
- IIIa. Main Vaal: Middle Vaal. Lower Vaal.
- IV. Free State: Central Free State. South-eastern Free State, etc.
- V. Western Bypass: Molopo-Groenwater. Upington-Hartbees. Bokkeveld.
- VI. Thirstland: Kaaieveld. Namaqualand. Winterveld. Trekkveld. Nuweveld-Gouw.
- VII. South-east: Upper Thornveld. Lower Thornveld. North and South Transkei.
- VIII. Lowlands: East London. Bushman's River. Port Alfred. Port Elizabeth, etc.
- IX. South Coast: Sunday's River. Grootrivier. Tzitzikamma-Knysna. Swartberg-Belvedere-Heidelberg. Gouritz-Karoo.
- X. Agulhas: West Langeberg. Breederivier. Botrivier.
- XI. Cape of Good Hope: Cape Hinterland. Cape Peninsula. Sandveld. Swartland.

Much of the above is not of general application, for instance the "Western bypass" was developed in following a

¹⁴ Goodwin, The Bored Stones of South Africa (*Annals of the South African Museum*, XXXVII).

particular migration route, and may have little relationship to other cultural elements. Many of the minor sub-divisions, such as Botrivier and Grootrivier, represent isolations of specific types of bored stones that may be by no means typical of other tools or periods.

From the purely ecological point of view a privately published paper by Dr. E. A. Nobbs, "Veld" (1941), throws considerable light on the main environmental characteristics of recognised "velds" in South Africa generally. It is hoped that a considerably enlarged edition of this work will be published shortly, with a map. In addition a broad zoning of Southern Africa in relation to the distribution of Bantu tribes can also be studied in a chapter by Goodwin¹⁵ on recent environment.

The need for such a system of regioning or zoning has been expressed by Professor van Riet Lowe¹⁶, who points out that "It is important to note that because we find six different evolutionary series on the great Highveld Grasslands and Kalahari Thorn-country of the Vaal River basin, we must not expect to find the same series in the East Coast subtropical bush — in Natal, or in the Cape Scrub-country." A year later (1938), in giving a statement on the policy of the Archaeological Survey, Lowe divides the Union into four major regions, each with its appropriate subdivisions:

1. Limpopo River Basin: A. Lower. B. Middle. C. Upper.
2. Orange River Basin: A. Lower Orange. B. Middle Orange and Vaal. C. Great Fish River and Great Kei River Basins. D. Upper Orange and Caledon River Basins.
3. Eastern Mountain Regions: A. Swaziland. B. Eastern Mountains.
4. Southern Mountain Region.

It is not yet possible to choose between these various systems, mainly because we have not yet got sufficient evidence of a detailed and intimate sort, from many wide areas to be sure that our zones have any real relationship to fact. Adjustment will necessarily come with knowledge through time. Certain broad areas can be accepted, and in the pages that

¹⁵ In Schapera: *The Bantu-Speaking Tribes of South Africa* (Routledge, 1937).

¹⁶ In Schrage, Visser and Lowe, p. 117. (1937).

follow, publications will be dealt with, — far as is possible, in relation to the areas to which they belong. This will provide not so much a history of the subject as a whole, but will yield a clearer picture of man's early story in these areas.

Study has largely been governed by the distribution of the railway system of the country, and has in places been inhibited by various nationalisms. This will all break down slowly — new motor roads are developed away from the chance directions preferred by our railways. Once the network of communications through the country is complete, it will permit workers to reach new and untouched fields.

For the moment broadly political areas will have to suffice, though the natural relationship between one political area and another must constantly be recognised. For instance, that between Southern Rhodesia and the northern Kalahari and Bechuanaland. The relationship between the upper Orange and the areas to the south-east has been recognised by Lowe and by Goodwin. The link is certainly there, but this south-eastern area (the Fish River, the Kei and so on) is in actual fact a junction or cross-road of culture, where the coastal route from Natal and the northern Transkei blends with the south-east drive, south of Basutoland, before the combined movement turns west towards the Cape Peninsula. This area must be considered in relation to both cultural sources, and not attached too irrevocably to either. Gooch would place the stronger link with Natal: Lowe would prefer the Orange Free State and Upper Orange. Each thinks in terms of the area most familiar to himself, so that similarities outweigh differences that happen to be less familiar. For the purposes of this Handbook (which does not cover South-West Africa) we can divide the country thus:

- I. Northern Rhodesia, divisible into Barotseland, North-eastern Rhodesia and Zambezi gravels.
- II. Southern Rhodesia, divisible into Mashonaland and Matabeleland.
- III. Northern Bechuanaland. An extension of Matabeleland.
- IV. Transvaal proper, north of the main Vaal tributaries and confined to the Witwatersrand and areas northward. Limpopo River should be separated.
- V. Natal, from Swaziland to Mount Currie.



- VI. The Vaal basin, divisible into the Vaal proper, and the western Orange Free State.
- VII. Lower Orange, including the Vaal confluence, and Southern Bechuanaland.
- VIII. Thirstland, including the Karoo, Winterveld, Trekveld, etc.
- IX. Upper Orange River and Basutoland.
- X. South-eastern Cape, covering the Transkei and coastal stretch to Port Elizabeth.
- XI. Southern Cape (perennial rainfall belt) from Port Elizabeth to Swellendam.
- XII. South-western Cape (winter rainfall belt) from Swellendam to the Olifants River, and including the Cape Peninsula.

PART III
REGIONAL COMMENTARY
I. NORTHERN RHODESIA

The best basic work on this area is a short survey undertaken by J. Desmond Clark (1939) which opens with the main topographical features of the country, and then discusses terminology. His scheme includes the following terms and type tools:

EARLY STONE AGE (Lower Palaeolithic)

African Pre-Abbevillian. (Pre-Chellean.) Pebbles and lumps of stone shaped into crude implements.

African Abbevillian. (Chellean.) Roughly shaped large hand-axes, made with a stone hammer. Large flakes (sometimes detached by a Clacton flaking technique) were often used.

African Acheulian. Well-made hand-axes and cleavers, produced with a wooden mallet. The primary flake, providing the blank for the tool, is first made by Clacton technique, later approaching a Levallois. Towards the end the tools are small and made from flakes.

N.R. Fauresmith. Diminutive hand-axes and cleavers, associated with tortoise cores and Levallois flakes.

MIDDLE STONE AGE (Upper Palaeolithic)

Developed Levallois. Small tortoise cores, Levallois flakes and points.

N.R. Stillbay. Pressure-flaked points with secondary work on one or both faces; backed blades, crescents, burins, etc.

LATER STONE AGE (Mesolithic)

N.R. Magosian. Uncertain, but represented by typical crescents and small worked points. A transition.

N.R. Wilton. Microlithic crescents, thumb-nail scrapers and ostrich eggshell beads.

NEOLITHIC ELEMENTS

There is not yet sufficient evidence to deduce the presence of a Neolithic culture, but distinct elements in the shape of ground and polished axes, pottery, etc., occur unassociated.

Having introduced Clark's paper, we can follow it further, building in appropriately from other works — best we can, to get a clearer picture of the cultures of Northern Rhodesia.

Victoria Falls and Zambezi Gravels

This should constitute an area in itself in any rational scheme of zoning. A recent paper by Cooke and Clark (1939) gives a detailed and well illustrated account of the immediate neighbourhood of the Falls, and its "northern" (here it is the eastern) bank. It is the result of a year's study of the area, and gives a general picture of the relationship between climate and culture observed in various deposits. These are, from below upwards:

- Various climatic alternations covering the Wilton and leading to present conditions and existing humus.
- A dry period ushers in the Later Stone Age.
- Later wet-phase: Levalloisian, Stillbay, etc.
- Dry period: probably related to the Fauresmith.
- Earlier wet-phase covers the evolution of the Stellenbosch (or Rhodesian Abbevillian and Acheulian).
- Climate becoming drier (Kalahari sands): Pre-Abbevillian (Pre-Chellean).

Compare this with Armstrong and Jones (1929 and 1930), who earlier noted the following changes: Pre-Chellean (Hope Fountain) implements predate the cutting of the fifth gorge. Early Stone Age man appeared before the cutting of the fourth gorge, and his tools were caught up in the gravels of the second pluvial period. Arid conditions succeeded, ending with the Middle Stone Age, preceding the third pluvial. Later Stone Age — then inhabited the valley.

In the second of these papers the relationship of man to the cutting of the twists and turns of the Batoka gorge, below the Falls, is given again and the following sequence is deduced. Read from below upwards:

7. "Bambata types".
6. Mousterian.
5. Levalloisian.
4. Clactonian.
3. Acheulian (Upper Stellenbosch).
2. Chellean (Abbevillian or Lower Stellenbosch).
1. Pre-Chellean, reflecting Hope Fountain material (see later).

Dr. H. S. Maufe sums up the history of the local geology in an addendum.

Additional evidence is drawn in Clark's paper from the Luangwa, Lukasasi and Lunsemfwa Rivers, whence material has been submitted by Messrs. Macrae and Lancaster, apparently representing the earliest phases of ■■■'s story so far known from this territory. The same two investigators have located further material in the Lundi valley. These are unfinished Acheulian (Late Stellenbosch) hand-axes of chalcedony and quartzite, followed by a phase with small unfinished hand-axes. Following these are less clearly identified elements from the lower gravel deposits, while nothing has been recovered from the present alluvium.

Broken Hill Cave

Unhappily there is little evidence of the types of tools associated with the Broken Hill skull. An early reference to stone balls, and Leakey's later discovery of implements, which he identified as belonging to the Rhodesian Wilton and to the Rhodesian Stillbay, from modern rubbish heaps, provide tenuous clues. There are only two skulls from Africa, apart from *Homo rhodesiensis* (found in the Broken Hill Cave) which belong to species other than our own; the Florisbad skull (discussed shortly under the Orange Free State) and the Kanam mandible from Kenya. A more careful watch is being kept ■■■ material from these heavily mineralised deposits.

Mumbwa Caves

Some years after a trial trench had been dug in one of these three caves (Macrae, 1926) excavation was set in hand under Attileo Gatti. While little stratification except the superficial layer of black soil, from one to three feet thick,

and the underlying ten feet of earlier deposit was noted, the material lodged by Gatti at the Rhodes-Livingstone Museum yields evidence of Rhodesian Wilton, plus Neolithic elements, and an evolutionary series of Rhodesian Stillbay. The description of the excavation (Dart and Del Grande, 1931) originally described a level containing "slag", but this material has been identified by Professor G. H. Stanley (1934) ■ cave deposit of sand and silt, cemented by calcium phosphate and calcium carbonate, and without any trace of iron.

Later excavation in these caves by Clark convinced him of the following sequence of events (Clark 1942): First we have ■ period during which the bed-rock decomposed to form ■ black gritty earth, which (in one cave) possibly includes evidence of occupation by man. Following this we have a deposition of aeolian red clay, suggesting an arid period when the caves were not inhabited. After this signs of habitation are definite, and the human series starts with Rhodesian Stillbay, associated with a seasonally wet and dry climate, resulting in the deposition of the red lower cave-earth and the cementing of certain portions to form a "hardened complex." The Northern Rhodesian Wilton is heralded by black upper cave-earth, denoting an increased precipitation and moister conditions generally. This leads on to the "Iron Age" cultures (Bantu).

The paper is introduced with accounts of the excavations and publications of earlier workers, and of the excavation in hand. The Rhodesian Stillbay and Rhodesian Wilton are analysed; and in conclusion Clark suggests that the Northern Rhodesian Wilton is a derivative of the local Magosian, which was itself derived from the regional Stillbay plus Neanthropic elements intruding into the final stages of the Middle Stone Age. Appropriate chapters in this paper were written by F. E. Zeuner and J. F. Schofield.

Further material ■ described by the Italian Scientific Expedition from the Manganese Claims ■ Chowa. No stratigraphical evidence seems to have been obtained, ■ the source was the infilling of a shaft dug for manganese, but the material recovered is highly representative, and includes a rectangular neolithic axe. A few miles south, Wilton implements were also found.

Neolithic elements, and shellmounds

From the Tanganyika plateau polished axes, bored stones, pottery, etc., are described by Clark. Some of the axes resemble West African types rather than forms known further south. They seem to accompany "Wilton-like tools." Bored stones occur commonly, and presumably here (as elsewhere in Central Africa) they may be tentatively attributed to early Bantu cultivators rather than to other prehistoric peoples.

In 1929 Leakey (1936) discovered shellmounds on the shores of Lake Tanganyika in the Abercorn district, containing burials and implements assigned by him to Wilton B. from Kenya analogies. Suspicions of a Magosian industry are aroused by sites on the Chifubwa stream near Solwezi and elsewhere.

For further information on Northern Rhodesia, the reader is referred to J. D. Clark's paper, which is unhappily not provided with a complete bibliography. As the original paper is out of print, it is to be hoped that this will be rectified in any future edition.

Ceramics

Various papers have been written on the relatively late pottery of Northern Rhodesia. L. H. Wells (1939) describes pottery from the excavations of Dart and del Grande (1931) and attributes the material to "the deeper levels of the Mumbwa Cave." He refers the material to the Zimbabwe class A pottery, but adds that "in the present defective state of our knowledge . . . the Mumbwa material takes up — isolated position among African ceramics." This paper evoked a reply from J. F. Schofield (1939), who points out that the pottery described cannot reasonably be said to have been found in the "deeper levels", and that the term "Later Stone Age" as used by Dart and del Grande carried a wide implication, covering both the Middle and Later Stone Ages. He concludes that the pottery shows similarities to modern Tonga (BaTokwa) pottery and to Ila specimens, etc. In this last attribution he finds support from Macrae (1939).

A later paper by Schofield (1943B) shows the necessity for exact identification of beads as a ■■■ of limiting the dating of sites. This is a field where imitation ("forgery") is extremely common, either by traders, in deference to native traditions, or by the natives themselves to emulate expensive and fashionable types. Over sixty examples ■■■ described, and while the evidence of "association" on a single string is practically valueless, the analysis of many hundreds of strings in a limited area would be valuable.

Other material has been discussed in Goodwin (1935) and need hardly be laboured here. The early writings of Mennell and Chubb (1907) ■■■ Broken Hill serve to-day as a belated warning against leaving recognised sites of archaeological importance to the mercy of the industrial and agricultural digger. This was an extreme case, but there are many others which still deserve attention to-day, both in Rhodesia and elsewhere. Mennell and Chubb describe implements and fauna associated with the lead and zinc deposits of the Broken Hill Mine, found at a date long previous to the discovery of *Homo rhodesiensis*, and therefore unhappily not associative. The evidence was sufficient to convince the authors of the great antiquity of men as revealed by these deposits. References to earlier work in Northern Rhodesia ■■■ be got from A. J. C. Molynex (1909). Future work in this general area will necessarily emanate from the Rhodes-Livingstone Museum and the Institute, and the terminology ■■■ far used (Earlier, Middle and Later Stone Ages, with appropriate cultural terminology drawn both from Kenya and from areas to the south) seems to be acceptable, and should permit us to link our cultures in this continent more and more closely ■■■ further excavation and analysis permit.

Northward Contacts and Highways

The peculiar situation and shape of this territory raises ■■■ whole cluster of awkward questions. Northern Rhodesia is shaped like ■■■ dumb-bell. The western part is Barotseland. The eastern part seems to have no separate title, unless some ■■■ such as "Bangweolo-Luangwa basins" is used. It is clear from ■■■ knowledge of conditions here that while

Barotseland has natural links with the tropical park-and-forest lands of the Belgian Congo, and the open bush country of Angola, the Bangweolo-Luangwa basin shows far stronger links with the great "cattle highway" of the interlake belt of the East African highlands. It is connected with the southern extension of the Great Rift valley and with many lake shores such as Mweru, Tanganyika, Bangweolo, Rukwa and Nyasa, and through them with Tanganyika Territory, Ruanda-Urundi, Uganda and Kenya. There is therefore every reason to believe that, while Barotseland may show evidence of migrations bearing cultures described by Dr. Francois Cabu from the Congo, the eastern portion may reflect peoples and cultures that belong to the lakes and to East Africa. Little is yet known of Barotseland, but the ethnographic divide suggested here should be watched extremely carefully in all periods, as it will certainly yield clues we need for analysis of cultural migrations further south.

No less important is the great tropical highway, almost traversing Africa at this point, provided by the Zambezi valley. Far too little is known of this river and the part it must necessarily have played as a barrier, highway ■ focus of cultures. What were the probable effects of increased or of a smoother perennial flow? Would this mean that the Zambezi was impassable, and if not, at what points could access to the south have taken place. Much might be done from a topographical survey to elucidate the part played by this great stream, both in prehistoric times, and during the proto-historic migrations of the Bantu.

I said earlier that on ■ account should a river valley be regarded as a boundary between cultural areas, unless it is sufficiently impassable, to be regarded ■ a barrier. It is highly probable that the Zambezi has always been passable by man during dry periods, and in spite of pluvial periods, man must have been able to cross this barrier at various points, even if only infrequently and precariously. Little careful analysis of the position at various points along this very important stream (be it divide or focus of peoples) has been published, except a few casual remarks by E. H. L. Schwarz, the geologist.

II. SOUTHERN RHODESIA

Neville Jones' very important book on Southern Rhodesia (1926) provides a somewhat meagre skeleton for Southern Rhodesia in the light of his — subsequent work, and it is to be hoped that it will be followed by a further book on this area, with the clearer perspective derived from later investigations. The original thesis made use of European terminology — far — possible, but we can generally translate these into their South African equivalents, — they may be appropriate.

Hope Fountain

The remarks on the Hope Fountain site given in *The Stone Age in Rhodesia* have been entirely superseded by two later papers (1929 and 1930). At this site was found a consecutive series in a cultural development which includes material described as Pre-Chellean (Pre-Stellenbosch) containing rostrocarinates, apparently in association with crude *coups-de-poing*, and flakes with evidence of Levallois technique. The Abbé Breuil, commenting on this site, considers that, while there is no stratigraphical evidence for dividing this material into successive cultures, heavy patination and rolling is evidence of the extreme age of at least part of these tools. Jones, too, speaks of "a probable early date of the Hope Fountain industry. Despite the presence of a very few implements that would seem to throw — doubt on the homogeneity of the industry, I am unable to discover adequate reason for regarding its latest development as any later than Early Acheulian or its South African cultural equivalent." Reid Moir (who had not — the site) suggests that "the deposit he is investigating is probably of Early Pleistocene antiquity."

The remarks of Armstrong and Jones (1929 and 1930) on the Victoria Falls have already been quoted above, and it remains only to add that much of the material from the sites below the fifth gorge show strong affinities with the Hope Fountain series. Similar evidence occurs on the Gwelo koppie (Jones, 1939A).

Sawmills

An undated paper (Neville Jones ?1943) — the climatic and cultural sequences at Sawmills, gives a more recent view of the position at that important series of sites. Sawmills (Sipopoma) is — the Umgusa River, and the sites cover recent deposits and earlier terraces. He and his collaborator, Geoffrey Bond, give the following sequence (from below upwards) of geological and archaeological episodes:

Present day. River beginning to deposit. Relatively wet.	
Black alluvium.	Sterile.
Sandy Hill-wash. Red alluvium.	S.R. Magosian or Sawmills.
Redeposited gravels (erosion of first and second terrace).	Non-rolled implements the older terraces.
Erosion. Wetter.	
Terrace gravel II.	Developed Levallois. (?S.R. Proto-Stillbay).
Erosion.	
Kalahari Sands.	Sterile.
Ferricrete.	
Terrace gravel I. (Basalt).	Bembesi Culture. Early Stone Age.

River gravels

A paper by A. M. McGregor touches upon other sites in the Umgusa valley, and describes how *coups-de-poing* occur in positions that suggest that they — derived from his "second type of alluvium" (red-brown to yellow).

Another undated paper (Neville Jones, ?1939B) gives an account of an early industry from the Mondoro Ranch, on the Muvandi River, near Salisbury. The implements are not rolled, and belong to "an old land surface occupied by man during — arid period. The succeeding wet-phase covered the surface rubble with a bed of alluvium, subsequent to which the erosion of the stream bed took place." The implements include pebble tools, *coups-de-poing* and developed Acheulian (late Stellenbosch) forms: Clacton and Levallois techniques

are evident. This suggests that in Rhodesia there is no vertical division between early hand-axe cultures and flake cultures, a suggestion borne out by the study of material in the Bembesi valley discovered by H. B. Maufe and described by Neville Jones (1938). In this Bembesi industry two flaking techniques — employed, the Levallois and the Clacton, and they are associated with *coups-de-poing*. This association of a Middle Stone Age technique with Earlier Stone Age methods and types, differentiates the industry from normal Middle Stone Age assemblages, and suggests that we — dealing with a natural emergence from the Earlier Stone Age, perhaps paralleling (though by no means identical with) the Faure-smith culture further south.

The climatic development here suggests much the — position. First we have a period of erosion, when the Bembesi valley was cut into the Karoo Series and a gravel containing Chelico-Acheulian tools was deposited. Later — great rise in water level further eroded the valley and deposited the 100 foot terrace. This took place prior to Middle Stone Age times, and coincides with — early phase in the development of the great-flake industries, which were eventually to give birth to the Middle Stone Age proper. This was followed by — dry period when the river subsided, but did not return to the original bed-level. A later rise permitted the swollen stream to cut into the 100 foot terrace and resort the gravels and scatter the material — the alluvial slopes and in depressions. Following this, the river abated once again and permitted the deposition of alluvium, until the actual state of degradation of the river bed succeeded.

Two papers by Neville Jones (1946) and by Geoffrey Bond (1946) give an account of more recent finds in Southern Rhodesia. Jones discusses an interesting and inclusive deposit from Lochard, some thirty-three miles north-east of Bulawayo. The site provides — very pretty picture of a series of deposits covering the bulk of the prehistoric period, and these deposits can be linked with the gravels of the Victoria Falls. The Alluvium I here equates with the Older Falls Gravel, and carries Earlier Stone Age implements on its surface. While the Older Gravels were accumulating — the Zambezi proper,

the two tributary streams at Lochard were building up the earlier alluvium. The wet-phase ■ represented was followed by semi-arid and arid developments which left ■ ferricrete deposit yielding the only remaining evidence of the position of the Kalahari Sands. These mark the end of the Middle Stone Age, and possibly supply the reason for the disappearance of this phase of human culture.

There is evidence of a second wet-phase between the deposition of the first and second alluvia. This is shown in the denudation of the former, ■ which Alluvium II lies unconformably. This later wet-phase ■ to coincide with the Younger Falls Gravels, and at Lochard the culture is a Proto-Stillbay. Finally, on the surface there ■ Wilton tools, presumably to be associated with two bored stones.

This whole sequence is worked out ■ clearly and in much greater detail by Mr. Bond. The sequence of the various wet and dry phases recognisable at many other Southern Rhodesian sites is briefly discussed. Tables relate Leakey's deposits in Kenya, and more certain correlations with the sequence worked out by Cooke and Clark for the Zambesi gravels are given. Had these two papers been published earlier they would have provided ■ with a better skeleton for our discussion of the Southern Rhodesian field.

Bambata Cave

The history of the various excavations in the Bambata Cave is a long one. Dr. G. Arnold and Neville Jones (1919) first excavated and reported somewhat cursorily on the deposit. Ten years later Mr. A. L. Armstrong ■ appointed by the British Association to undertake work in various fields, including this site. The appointment from overseas ■ to have been somewhat unfair to Mr. Armstrong, whose work in the European field, and whose knowledge of the implements and cultures of Europe (and especially Britain) ■ extensive. The sudden reapplication of this knowledge in a new field, with a different climatic history and in new materials, ■ somewhat risky. Pits were sunk in the Bambata deposit, and certain conclusions were drawn, the chief of which dated the Lower Cave-earth ■ Acheulian (late Stellerbosch); and also gave a story of alternating layers of Neanthropic

(Later Stone Age) and "Bambata culture" (Middle Stone Age), and thus placed the Later Stone Age intrusion into the country somewhat earlier than it actually was (Armstrong 1931).

Neville Jones' latest interpretation of the deposit, made just before the war (Jones 1939), contained remarkable reversals of this position, which had always been puzzling. Jones failed to find any proof of the presence of Neanthropic influences at any time earlier than the Magosian culture (his Sawmills industry), and could find little evidence of progressive cultural advance in the Stillbay layer (Upper Cave-earth) apart from the development of the point. The layer is otherwise homogeneous throughout. In addition he could discover ■ sufficient evidence of the presence of ■ "Mousterian culture" (in the strict sense), and in fact evidence exists to show that there was an advanced Mousterian (Middle Stone Age) at a lower level. Armstrong's intercalation of two recognisably distinct layers of cave-earth can ■ be credited to natural agency and ■ therefore without cultural significance. What had obviously happened was that a central heap of material had slipped, spread and gravitated into the accumulating layers adjacent to it, to produce ■ localised effect of alternating strata.¹⁷

The Lower Cave-earth cannot now be regarded as Earlier Stone Age in date or culture, but is Middle Stone Age, and includes ■ industry that Neville Jones regards as "directly ancestral to the Stillbay," and therefore calls the Rhodesian Proto-Stillbay. Crude hand-axes (choppers) occur in ■ association with advanced Levallois forms, and the suggestion is that ■ are dealing with ■ very broad equivalent with the Pietersburg material of the Transvaal. All this has left the position of the "Bambata culture" somewhat less clear than before.

The Middle Stone Age

Unhappily Neville Jones' survey of the Middle Stone Age in Rhodesia (1932A) was written in the light of Armstrong's original findings, and therefore needs rewriting, but we can

¹⁷ This action is extremely common in the ■ of heaped shells to coastal middens, where the dunes contiguous to the heaps of shell often show false stratification of the same sort.

make some use of the paper here. Jones points out that the Levallois technique, with little alteration, persisted — far south as Rhodesia, and can be supported from sites at Gokomere, Esipongweni and from the Umgusa and Bembesi gravels.

At Gokomere, Father Gardner excavated a cave at the foot of a hill in which his better-known Wilton shelter is situated. He discovered a number of cores and flakes immediately beneath a thin superficial layer of Wilton and other late material. These showed late Levallois forms, faceted butts and the usual associated cores. Two typical Mousterian points, a few crudely made *coups-de-poing* and — generally poor and formless scrapers, were found. At Esipongweni, in a shallow borrow-pit used for road-metal, a layer of old alluvium, thinly capped by vlei-soil, was observed, in which occurred lenticular patches of coarse gravel and fairly numerous flakes. These last were associated with tortoise cores, crude hand-axes, points, scrapers, notched flakes and tap-borders.

The various gravels in the Bembesi and Umgusa rivers, originally described by A. M. McGregor (1920), have been revisited by Neville Jones and included in his Middle Stone Age paper. Waterworn *coups-de-poing* occur with recognisably different and unworn Mousterian forms, broadly similar to those from the sites just quoted. At Esipongweni it was possible — one point to locate a thin layer of sand dividing Earlier and Middle Stone Age types, though elsewhere in this valley the types — mixed, but show consistently different physical condition.

Other developments of the Mousterian theme, ending in the Sawmills (Rhodesian Magosian) could be enumerated, but it is hoped that the weft and warp of the Rhodesian Middle Stone Age will be more deftly — by Neville Jones himself.

Later Stone Age

Probably the best descriptions of Later Stone Age sites in Southern Rhodesia are to be found in papers by Neville Jones (1933A) and by Father Gardner (1928), also Gardner, Wells and Schofield (1940).

Breuil (1930) had touched briefly on the differences between the Southern Rhodesian and southern Wilton—presumably from the south-eastern and Cape regions. The main interest of Neville Jones' paper lies in his more detailed correlation of the two phases. This follows a full and very important study of the stratification, climatic evidences and typology of the deposits in Nswatugi, Madilinyangwa and other cave sites. Jones draws attention to the fact that Hewitt (South-eastern Cape) describes as "older southern Wilton" various forms and characteristics that in Southern Rhodesia would be deemed "Later Wilton"; so that what is found at some depth in the south-eastern Cape would be expected near the surface in Rhodesia. The last phase of the Rhodesian Wilton is thus the equivalent, in type and time, of the first stages of the south-eastern Wilton. He therefore gives the following suggested terminology for the broad Wilton culture, cutting across the gap of well over a thousand miles that divide him from Dr. Hewitt:

Later Wilton: Southern area only. Few crescents.
Larger scrapers. Red pottery.

Middle Wilton: Rhodesia and S. Area. Abundant microliths and early polychromes.

Older Wilton: Rhodesia only (Bambata). Microliths generally larger and less developed than in Middle Wilton. Chocolate-ochre paintings.

The consistent presence of dots and hands in red ochre in association with the Later Wilton in the extreme south might be added to the latest stage.

This generalization is dangerous only if it is to be presumed upon, but it is very valuable indeed — a broad assessment of the relationship between two widely separated areas¹¹. The Wilton as known at the type-site (Albany district, Cape) differs from that recognised at the Cape Peninsula, seven hundred miles away. But what is more striking still is that Wilton sites at the Cape may differ very considerably from one another within a matter of ten miles. There is certainly a chronological element (to be discovered from excavation) to explain this; but it does show the danger that

¹¹ See Goodwin's article on terminology in the South African Archaeological Bulletin. Vol. I No. 4.

might lie in presuming upon ■ shrewd but broad generalization of this nature.

At Nswatugi and Madilinyangwa, the Wilton culture includes detaching hammers, fabricators and anvil stones; scrapers (circular horseshoe thumbnail and end-scrapers), burins in considerable variety (angle, micro-burins, etc.), crescents, microlithic points, blades and piercers, *lames taillées*, bone tools, grindstones and mullers, pestles, ostrich eggshell beads, slate pendants and so on. At Nswatugi a section of an edged disc is associated. A somewhat similar assemblage is represented in Father Gardner's original shelter at Gokomere, overlying ■ few Middle Stone Age flakes. In ■ recent paper Father Gardner, L. H. Wells and J. F. Schofield (1940) have devoted themselves to ■ study of the pottery and beads from the deposit overlying the Rhodesian Wilton. This final layer appears to cover the Zimbabwe period. Both beads and pottery reflect Zimbabwe material, and links can be forged with the Mapungubwe site ■ the Limpopo. The final date to which this shelter was inhabited ■ thus be brought down to a little ■ a century ago. Similar historic and protohistoric pottery forms ■ discussed by Father Stapleton and J. F. Schofield (1938). These are found in general association with Bantu iron, ■ the paper falls within the ethnological, rather than the pre-historic field, and links with Schofield's address to section E of the South African Association for the Advancement of Science (1941).

An early paper by Father Gardner (1910) and a later one by Goodwin (1930B) describe various polished implements from Umtali, Bulawayo and Salisbury, and from sites north of Salisbury. These are sufficient to show that definite Neolithic influences ■ present, apparently contemporary with at least part of the Wilton. Most of these tools seem to be more closely allied to South African forms, but, ■ Burkitt (1928) points out, one example from the Battlefields site shows greater affinities with Northern Rhodesian Neolithic implements, and other Central African material. This book by Burkitt ■ a good summary of the general position as it was known in Southern Rhodesia at the time of his visit, and

served to stimulate a general interest in the prehistory of South Africa. In addition to useful references to Southern Rhodesia it covers the Union, and gives good illustrations. (See Part III, General Works.)

III. NORTHERN BECHUANALAND

Relatively little is known of Bechuanaland, though several minor collections, of little value either as representative series — yielding geological evidence, have come from there. The northern parts — to be an extension of the Matabele-land portion of Southern Rhodesia, linked perhaps by the Kalahari Sands, and separated from the southern section (which we shall deal with somewhat shortly after the Vaal River and Lower Orange) by the existing Kalahari desert region. The eastern side of the Protectorate obviously belongs to the Western Transvaal.

In a discussion on a paper by R. B. Young, H. B. Maufe (1925) suggested a cultural limit to the Quaternary period, "I refer to the bouchets of Chellean and Acheulian type . . . Geologists are slow to realise that these bouchets may be used as a zone-fossil to define the lower part of the Lower Pleistocene, — the beginning of Quaternary times." Maufe himself often made use of the presence of prehistoric tools to help him in dating Rhodesian deposits, and the fact that a paper — the calcareous tufas of the Campbell Rand should have evoked such an important statement is perhaps their most useful function.

Our best publication — once again from the hand of Neville Jones (1920), a paper augmented and reorientated in his summary of the Middle Stone Age in Rhodesia, after having revisited Taungs on several occasions. At this site Earlier Stone Age tools are found together with Mousterian forms (Middle Stone Age), but the "marked difference in the implements is unmistakable . . . the typical Mousterian technique is strongly in evidence, and points — abundant. Some of these, however, show trimming not only — the upper surface of the flake, but a certain amount of trimming appears on the under surface. This is confined to the butt, and the bulbs of percussion are carefully removed. The burin also occurs, though I have only found one example." He adds

"tortoise points," side-scrappers and other scrapers, and small *coups-de-poing*¹⁹. This Mousterian occurs as a distinct layer above the gravel containing older implements, but also in close association with Earlier Stone Age material. "It is evident from this that Middle Stone Age man lived in the vicinity at the time of the resorting of the older gravel, and remained there until lacustrine conditions, resulting in the deposition of the thick overlay of alluvium, supervened; that is to say, at the end of the pluvial period, and contemporaneous with similar conditions in Southern Rhodesia." He goes on to compare the Taungs Mousterian with the Glen Grey culture of the Eastern Cape Province (Goodwin and Lowe, 1929).

I have retrieved various developed Levallois forms from sites near Gaberones, Ramutsa, etc., without any geological evidence from what are scattered surface sites, but Later Stone Age material is markedly absent. From whatever direction I have penetrated into the Kalahari region, from south or east, I have been unable to locate a single Later Stone Age site. What is to-day the refuge of the Bushman seems to have been left severely alone as too arid for reasonable occupation. This objection has certainly been overcome recently by the fear of death — the hands of "higher races" outside. There should, however, be abundant remains of the Later Stone Age along the main river-beds, and, indeed, Prof. van Riet Lowe (1935D) in commenting very briefly — implements brought back by the Vernay-Lang Expedition, includes tools from all three stone ages. E. J. Wayland, now attached to the Bechuanaland Government, has collected a good series, which deserves full publication. A short paper by S. Schonland (1904) mentions two stone implement sites — an old Bamangwato village. Pottery is associated.

IV. TRANSVAAL

Considering the density of the present population of the Transvaal, very little indeed has so far been written about this vast area. Apart from Leith, Penning and a few other writers during the last century, little — done before the

¹⁹ Jones' remarks on the position at Tygarkloof should be looked up in his original paper, or in Goodwin, 1936.

arrival of Johnson, and — after his death a few remarks by Collins and Smith and half a dozen other writers cover a third of our present century. This is certainly the most meagrely described of any of the provinces of the Union.

Pre-Stellenbosch

Several writers, following Leith's Eoliths from the Aapies River gravels, have sought in the Transvaal for the earliest phases in man's story. Perhaps this is partly due to the recalcitrant materials that man was forced to use in many areas, but more recent writers have presumably got past the phase when any ill-made or unfinished tool is regarded as more primitive and early than a finely finished example.

Johnson (1903B), in describing implement-bearing deposits near Johannesburg, finds evidence of the presence of three periods from the farm Elandsfontein No. 235. In a later paper (1904A) he gives a résumé of his finds, and an excellent illustration of his "Neolithic" (Smithfield C) tools. The other two series — illustrated in the paper quoted above. He gives the following groups:

- "(1) A group presenting the complete facies of the Eolithic implements of Southern Britain;
- (2) Another group, equally identical with the true Palaeolithic implements;
- (3) A series of minute and neatly made implements, comparable to the pygmy flint implements, which characterise the Neolithic period of Europe."

J. C. Smuts, Jr. (1938B) brought forward evidence from the Pretoria-Benoni area for pebble tools that in his opinion lead us right back to the most remote human times. In a tentative correlation, he suggests that the deposits discussed belong to a First Pluvial period, probably to be related to the 200 foot terrace on the Vaal, and therefore (in the opinion then held) of Pliocene date. His generalizations — broad and his comparisons sweeping and inclusive.

Perhaps — should include here a paper by E. J. Wayland (1929) in which he described an industry of crudely broken pebbles from the Belfast area. He compares these broadly with pebble tools he described from Uganda — the

Kafuan culture, and with the Darnsden material from Britain. This would place these tools far back in time, well before the Stellenbosch period. His evidence at this Balfour site is, however, only sufficient to permit him to say that this "pebble-culture" is of pre-Mousterian date.

The Makapan Caves

In 1925 Professor Raymond Dart (1925B) drew attention to the importance of these caves in the Pietersburg district of the Transvaal. A thick breccia of bones was discovered containing some charred bones, all of which had been broken; sufficient indications of the presence of man. No human implements had then been found. Subsequently Professor van Riet Lowe (1938B and 1943) visited these caves, and realised that the deposits should provide the background of climate and fauna that is so essential for the Transvaal prehistoric period. All the material of importance (and these vast deposits) seems to precede the Middle Stone Age. In his first paper he quotes Wagner's account of the climatic sequence here: "So far the area under review is concerned, every valley in the elevated tract in its north-western portion tells the story of (a) vigorous erosion, followed by (b) an arid period when the streams were overloaded with sediment, which led to their valleys being aggraded with fine silt; and finally (c), renewed vigorous erosion by the present streams which have cut down through the fine silt to bedrock or to the coarse gravel with which the valley is floored." The material for the evaluation of climatic history, applicable to the whole of the Springbok Flats and Central Transvaal, should therefore be available, both from the cave deposits and from surrounding country.

Lowe stresses the need for some effective protection for these limestone caves, and others like them. Many have already been exploited for lime-burning, but much still remains at these and other sites and should be adequately dealt with before evidence is completely lost.

In the second paper, Lowe notes that about 600 tons of artificially accumulated breccia from prehistoric times had collapsed from below the main hearth deposits, and in 1940

this was examined. Only ■ fraction could be touched at ■ time as the bones and tools ■ difficult to extract. Several hundred flakes ■ recovered together with their associated ■ fabricators.

The first inhabitants of the cave were Earlier Stone Age men, with a Stellenbosch culture and primitive Clacton and Levallois techniques, possibly showing relationship to the Victoria West material, though without the débitage that would normally be associable in an open air site.

It is to be remembered that this mass of breccia has collapsed from *below*, so that the ceiling of the "cave" so formed will necessarily consist of later material. What this will prove to be is still uncertain, but artefacts that may be Middle Stone Age spherical throwing-stones, ■■■ at the probable line of cleavage of the fall (i.e. the surface of the fallen matter). The associated flakes are, however, very likely to be trimming flakes struck off in the making of Stellenbosch tools.

We ■■■ confronted here by ■ general picture that fits in well with some of Neville Jones' findings in Bechuanaland and Southern Rhodesia, for Lowe suggests that if Middle Stone Age man lived here his culture had some strong affinities with the more typical hand-axe industries. In studying the cave he points out that differences between assemblages expected from open sites and from the caves must be allowed for.

In 1943 a return was made to the sites by Professor van Riet Lowe, accompanied by B. D. Malan, and the Abbé Breuil. The Abbé was at once struck by superficial resemblances to the *Sinanthropus* ■■■ at Chou Kou Tien (Pekin), and by a marked preponderance of what he described as "Tayacian elements" from the lower levels in the fallen mass. Further careful analysis of these deposits is essential, but we certainly have every reason to suspect that in the lower deposits there should be certifiable assemblages, associated with ■ typical fauna, that will once and for all settle the position of Pre-Stellenbosch man in South Africa.

It is curious to note that neighbouring caves, for instance the Rainbow Cave (so called from the alternating pastel

shades visible there, very typical of deposits in limestone), yielded only advanced Middle Stone Age material of Pietersburg type, and ■ Earlier Stone Age implements occur. It is obvious that these caves were not simultaneously inhabited, but that they cover together a vast span of man's story, probably up to the very dawn of the Later Stone Age, at which time the already filled-in caves were sealed off by stalactitic deposition. Here, then, from the type-series slowly being developed from the breccia, and by comparison, from the implements discovered in related river deposits, we should have an excellent basis for the early history of man in the Central Transvaal.

J. C. Smuts, Jr. (1938A) has tried his hand at evaluating the climatic history of the Springbok Flats area. He has dealt similarly with the Witwatersrand (1945A). Evidence is still far from convincing, either typologically ■ from the climatic phenomena observed on the sites themselves. What little evidence exists is used to reapply Leakey's equatorial evidence to this summer-rainfall area, covering the broad period of the Stone Age. The second paper contains a very clear exposition of the whole field of pre-palaeolithic cultures in South Africa, in some detail. Smuts concludes that a considerable period is covered, and that there is evidence that the Stone Age in South Africa is of great antiquity, with more complicated earlier phases than is generally appreciated. This is a field attractive to research, as man may have developed and advanced considerably at an early period. Even if provocative, these papers should lead to further research along these lines, both by Smuts himself and by others.

In a later paper Smuts (1945B) describes elements of his Benoni pebble-cultures from the Eastern Limpopo basin, and suggests that analogous forms are widespread in Africa. He touches ■ pre-palaeolithic and Abbevillian (Lower Stellenbosch) forms from Rietvlei, Louis Trichardt, Wylie's Poort, and elsewhere.

Earlier Stone Age

The Stellenbosch culture has long been known in the Transvaal, especially on the Witwatersrand. A series of

papers by Johnson (1903B, 1904A and B, 1905E, etc.) describes the discovery of Stellenbosch types from Elandsfontein No. 235 (quoted above), and from Taaiboschspruit, south-west of Vereeniging. Here he found stratified deposits showing palaeolithic implements, of typical Stellenbosch form, from below the alluvium, in a layer of coarse gravelly detritus. They are of greenstone, and show considerable variation in size, from 9 cm. to 22 cm. in length. Some are made on side-flakes. Lying above the alluvium are examples of his Taaibosch industry (named from this site) or what we would call Smithfield C to-day. From the Krugersdorp valley he obtained waterworn Stellenbosch artefacts, two *in situ* in the coarse detritus, and four washed out from this layer. One is a cleaver, the remainder are *coups-de-poing*, all made of quartzite, except a single example in white quartz.

E. R. Collins and Reginald Smith (1915) give an account of implements from a variety of sites, some in the Transvaal. Flakes and Stellenbosch implements are described from Vereeniging, *coupes-de-poing* from Panfontein farm, Heidelberg, from Klerksdorp, Vlakfontein, Kaffirspruit, and Palmietfontein. The paper contains much interesting information on the river gravels and associated deposits, and should therefore prove an excellent guide to future workers in the Transvaal and elsewhere.

Middle Stone Age

Little has appeared on the Middle Stone Age in the Transvaal. Apart from a few comments by various writers on the abundant Middle Stone Age material from the Springbok Flats, J. Harcus seems to be the only person who has attempted to give a relatively complete picture of a single site (1944). From Primrose Ridge, Germiston, he describes a variety of forms, some novel in type and nomenclature, from the excavation of a building site. The materials are mainly chert and white quartz and implements often reach a high degree of excellence, suggesting general associations with analogous material from Swaziland and the northern Transvaal. A similar paper by Harcus (1943) describes tools from Bedfordview, east of Johannesburg. The site appears to include both Middle and Later Stone Age types.

Very considerable work is still in hand on the whole question of the position and ramifications of the Pietersburg Culture in the Transvaal. It is now known that the typology includes the *coup-de-poing*, as well as the advanced points sometimes trimmed on both faces, originally described by Goodwin (1928B). This suggests affinities with Neville Jones' material from Taungs. It is to be hoped that Mr. B. D. Malan will find himself in a position to describe this material fully, and to place it more exactly in the general chronology of the Transvaal, and in its true spacial relation to surrounding cultures. (Cf. Cooke, Malan and Wells, 1945.)

Later Stone Age

Apart from Johnson's papers cited above, containing references to the Smithfield C culture, he gives a few additional sites for his Taaibosch type (Johnson 1905A and B) from the farm Vlakfontein No. 155, from Waterval No. 417, and (1904C) from Elandsfontein No. 1. Collins and Smith (cited above) give types that may well be crude Smithfield A forms from the Western Transvaal.

Discussing rock paintings from a Northern Transvaal site, in the Zoutpansberg (Pietersburg District), Noel Roberts (1916) describes a series of paintings resembling Rhodesian rather than Union types. The implements that Roberts associates appear to include Pietersburg material (Middle Stone Age). His illustrations show good lance-heads, several uncertain flakes and a grooved stone. This last presumably belongs to the rather questionable Later Stone Age implements he has photographed.

Neolithic Elements

Neolithic elements occur. Two found by Miss Orford at Regina (1934) consist of a tanged lanceolate tool and a dagger or knife-blade constricted towards one end. The description is somewhat unsatisfying, apart from a statement that they were found at a depth of twelve feet, little is given about their provenance. They do not fit in with any other artefacts in South Africa. Their association with polished stone rings suggests a relative lateness, but nothing

more. The material is a mixture of soapstone and quartzite, but no indication is given in the paper as to hardness. Goodwin (1930B) also describes two polished axes from Potchefstroom. (Cf. Laidler, 1939.)

While the publications on the Transvaal have so far been somewhat unsatisfying, much important work remains unpublished, and will certainly produce profound changes in our knowledge when it is eventually released. No references have been given to Transvaal material described in Burkitt (1928) — in Goodwin and Lowe (1929), and direct reference to those two sources will enlarge this short commentary considerably. J. P. Johnson's books are also of importance.

V. NATAL AND ZULULAND

With Natal and Zululand we shall here have to group Swaziland and the territory of Mopambique, though relatively little has been written about either. A paper by van Riet Lowe and the Abbé Breuil (1944) gives a few superficial notes on a series of sites along the Umbeluzi and Incomane rivers. These are mainly Early Stone Age sites, and in each section of the paper the same series of about eight sites is covered. The Mopambique Geological Survey has begun to take some interest in prehistoric deposits in that area. Alexandre Borges (1945) starts with a general physical, geological, and faunal description of the area about Magude, and goes on to describe the implements retrieved from sites here. He differentiates between tools and rejects, then describes and illustrates pebble implements, *coups-de-poing*, knives, points — blades, side-scrappers, endscrapers, hammerstones and cores representing what is probably an early stage of the Stellenbosch series. It is to be expected that the survey will begin to publish more extensively in time. When this happens, full cognisance of the work must be taken by Swaziland, Natal, and by Southern Rhodesia, in order to get a full appreciation of the warp and woof of cultures and migrations through time and in the face of changing environment.

Swaziland

Considerable material has been collected in Swaziland and the best sources of information — J. P. Johnson's books

(1910A, etc.), Rupert Jones (1898), and Goodwin and Lowe (1929). Jones describes implements of Stellenbosch type from the tin-bearing gravels of the Mbabane River. "All that we know is that [redacted] of the gravel lies on the hillside above the River Embabaan, and [redacted] of it—derived from those higher gravels—in the river bed. Therefore sufficient time must be allowed for the river to have lowered to its level in the valley."

Périguey's correspondence with Mr. B. Nicholson, the Government Secretary for Swaziland, concerning material discovered by Mr. Pote, is given in Goodwin and Lowe. Little need be said here, save to note that three periods [redacted] fortuitously associated; Earlier Stone Age (represented by excellent *coups-de-poing* in indurated shale), [redacted] advanced Middle Stone Age possibly allied to Pietersburg or East Coast Stillbay, and finally, Bantu iron bangles. J. P. Johnson's work is mainly concerned with Middle Stone Age ("Solutrean") types from the same area (1907B) and their chance association with Stellenbosch forms.

The contrasting altitudes, geography and geology of Swaziland should supply a clue (as should the extreme Eastern Transvaal and Mashonaland areas) to the contact here between two markedly different environments. The Lowlands may continue the cultural history of Portuguese East Africa, and pass it on to Zululand and Natal, in contrast to migrations and movements confined to the Highlands and linked with the Eastern Transvaal.

In Natal the distribution of bored stones (broadly, the disc-like or flattened oblate, in contrast to the globular) shows that there are, in the appropriate phases of the Later Stone Age, two regions or belts. The former type is confined to the coast and an inland stretch rising perhaps to two or three thousand feet. The latter is typical of the uplands above that level, but follows the great rivers, such as the Tugela, to the coast. It is obvious that the [redacted] of the globular type were an inland people, stretching up to the top of the escarpment, and linking with the South-eastern Transvaal by way of the headwaters of the Klip, Wilge, Buffalo and other rivers. There is as yet no suggestion of any affinities with

the Free State. The coastal folk, in contrast, suggest links with Moçambique, though too little is known to make any deductions. It is as yet impossible to say how far such routes of migration affected early phases of man's history.

Earlier Stone Age

Several general papers have appeared on the stone ages in Natal, and we might well take them as the basis for a short survey. The first of these is by J. C. Cramp (1935), who briefly discusses the Lower, Middle and Upper Natal Stellenbosch phases and describes the tools attributed to them. His sites are in the Umhlaas River gravels (ten miles south of Durban), where he finds crude and coarse Lower Stellenbosch forms under the overlying red sand. At Dumisa (fifty miles north of Durban) there is a suggestion of a wet period, and in the hillwash, under a surface deposit of three to seven feet in thickness, he finds Middle Stellenbosch artefacts. At Red Hill, in the Tugela District, sixty miles north of Durban, and at Emoyeni, thirty miles north of the Tugela, he describes the discovery of Upper Stellenbosch types from the summits of hills and in deposits of apparently no very great age. In a later paper (1936) he suggests that this latter material represents an evolved Stellenbosch, perhaps with cultural contacts. He refers to a somewhat obscure "New terminology of European Cultures," and shows that it is not applicable to Red Hill and the Tugela Industry, but as he gives no bibliographical reference to the terminology, it is left uncertain as to whether it is to the scheme proposed by Menghin, that evolved for France and Britain, or to another system that he refers.

Lebzelter and Bayer (1928) describe and illustrate a number of cultures from sites in the Zululand Highlands. They deduce a series, but somewhat oddly place "hand-axes of old palaeolithic character" as their latest cultural stage. The rest of the sequence is more credible, and Lebzelter seems to have given in on this point in his later general work (Lebzelter, 1930).

L. J. Krige in two papers — the geology of Durban (1932A and 1931) gives some account of the changes of sea-level. These he attributes to the volume of water contained

in the polar ice-caps during glacial periods in high latitudes. "The surface of the oceans was lowered very considerably during the glacial periods, and raised by corresponding amounts during the interglacials. . . . Before the advent of cold conditions at the beginning of the Pleistocene, the climate of the whole earth — warmer than at present . . . this must have caused sea-level to stand between 150 and 210 feet higher than it does at present."

To the Pleistocene he attributes the Bluff Peninsula, and the deposition of much of the red and brown sand that covers the coastal belt. These are the deposits discussed above by J. G. Cramb. Probably much good use could be made of Dr. Krige's work by amateurs and professionals in the Natal coastal strip, and along the consequent gravels which must have been left as the land-fossils of these various changes in sea-level. These, too, should provide — excellent check — the levels of L. J. Krige's beaches.

Middle Stone Age

A useful paper by P. G. Brien (1935B) does make considerable — of L. J. Krige's findings. It consists of a two years' study of a cliff which was being quarried for reclamation work. This cliff is related to Krige's 20-foot beach. Eight horizons are described in detail and their general relationships — discussed. Some five of them — industrial layers, the remainder apparently sterile. The earliest presents a Middle Stellenbosch phase, followed by a Middle Stone Age of early facies, and, after a considerable lapse of time, Late Stellenbosch types — deduced from Cramb's (1935) Tugela site. A series suggesting broad affinities with Goodwin's Cape Flata Complex (Goodwin 1930B, 1933B, etc.) lies on the surface of the crucial red sands. Later Stone Age types follow, without endscrapers, and these — referred to Mrs. Brien's "coastal Smithfield." Finally a microlithic series occurs.

The presumptive evidence linking these deposits with Leakey's East African climatic phases is not in itself convincing, coming as it does from a single site. The hypothetical link with the European climatic cycle rests, therefore, upon two presumptions: the legitimacy of Leakey's deductions

and the validity of Brien's hypotheses. Further work is necessary on these points, and Brien does supply evidence that will prove of value in the future.

Brien (1935A) has also given a useful introduction to the Middle Stone Age in Natal. Basing his series on morphology, patination and refinement of technique, he divides the available material into an Early and ■ Late phase. No correlation between these and material from other provinces is yet possible, and it is obvious that far more work will have to be put into the Natal Middle Stone Age before this can be attempted. The Early phase includes small *coups-de-poing* types ("miniatures") rather similar to Fauresmith forms, and Brien suggests contacts between these two cultures. Neville Jones' persevering work on Southern Rhodesia and Northern Bechuanaland makes such a suggestion unnecessary, and B. D. Malan's unpublished work on the Pietersburg series will probably show convincingly that there is a very definite *coup-de-poing* element represented in certain phases of the Middle Stone Age. The further suggestion, that Smithfield contacts are present, need not detain us at the moment. The Late phase includes material resembling Swaziland forms, elements suggestive of "Bambata" and Still Bay types.

A typological paper by B. D. Malan (1944A) describes ■ number of Middle Stone Age implements from Izotsha, Umkomas, Newcastle and other districts, including the Tugela mouth, collected by J. A. Swan and others. Malan shows that industries containing lanceolate bifaced points have a wide distribution in Natal, and that many show an advanced technical ability. Débitage and technique suggest differences between these Natal lance-heads and those of the Cape Stillbay. It should be remembered that in developing the terminology of the Middle Stone Age Goodwin always stressed the importance of the "oakleaf" points (*festonné*) and the diagonally struck points, both of which are essential elements of the true Stillbay in addition to the more striking bifaced lanceheads, and that the Natal and Swaziland material was relegated by him to the Pietersburg variation. This latter relationship may not be borne out by the intimate knowledge of the Pietersburg culture which Mr. Malan is

acquiring; but it is important to note that the label "Stillbay" applied to any culture containing bifaced lanceheads is apt to be as misleading as the application of the term "Solutrean" to the same series. One typical implement does not make a basis for cultural identification.

Other Middle Stone Age material is described by Chubb (1932) from Izotsha, and by Lebzelter (1930) from a number of different sites in Swaziland, Zululand and Natal. Breuil (1937) describes a Y-shaped point from Eatcourt, which in his opinion suggests "a native replica of a well-known type of Egyptian object." The technique is apparently of late Middle Stone Age date.

The excavation of a Middle Stone Age deposit in a cave in the Lebombo Mountains by Cooke, Malan and Wells (1945), following a test by Dart some ten years earlier, shows a rich Middle Stone Age deposit (assessed as Pietersburg Culture) presenting a continuous development, in which the more advanced phase includes small triangular points, finely trimmed — both faces. One or two extinct faunal species are associated, also an adult skull and parts of an infant skeleton.

Later Stone Age

The Later Stone Age of Natal has an amusingly contentious interest of its own. Goodwin (1930A) described a series of implements with obvious Smithfield affinities, which included a number of strangulated scrapers and Y-shaped scrapers, sufficient to suggest that we are dealing with a variant of the — usual Smithfield — we know it from the Free State. While the material (here called Smithfield N) is divided into three general groups by patination, there is no other evidence of chronological difference. — suggested that in view of the rarity of the strangulated scraper in the Free State Smithfield, hooked scrapers, etc., which are abundant in this series, may have resulted from contact throughout the period with Smithfield A and Fauresmith traditions from the Free State. A later paper by Goodwin (1934) attributes the origin of the Smithfield N notched and strangulated scrapers to impacts entering Zululand and Natal from Rhodesian sources, to produce the Natal variant by culture contact with a normal Smithfield.

Lowe (1936A) in a reply to these views, after discarding the probability of any Fauresmith contacts as far too tenuous, goes on to the description of two further sites, Totheng, about two and a quarter miles from Lion's River Station, and Webster's Farm, a few miles from Balgowan, forming a triangle with Goodwin's Weenen site. He concludes from his evidence that "this N variation — its peculiarities—a variety of conventionalised notched scrapers—to a migration from the — grassy plains to the well-forested regions of Natal." Lowe admits that he "cannot escape the suspicion that the home of the Smithfield Culture lies in the great triangle above the confluence of the Vaal and Orange Rivers." While acknowledging that "elements may certainly have filtered into Natal from Rhodesia and affected the development of the Smithfield N," he points out that "Rhodesia lacks most of the essential elements of the Smithfield Culture as a whole."

Here the matter will rest until further evidence from Natal and the Transvaal is available. I say the Transvaal, as an unpublished work on the distribution of the bored stone (Goodwin, cited above) shows clearly that the bored stone (which is at times associated with the Smithfield N complex) did not enter the Natal area from the Free State, but from the Transvaal by way of the Wilge and Buffalo Rivers. This might well supply the route by which Rhodesian or related elements entered Natal, perhaps as an integral part of the Smithfield culture, and might also account for the absence of what Lowe regards as "normal Smithfield" in Natal. There is always a danger that in discussing the diffusion of inventions and cultures a writer will regard the area best known to himself as the original source of the diffusion. It seems just as possible that the "proto-Smithfield" is of upper Vaal origin, spreading to the Free State and to Natal from the region of Vrede and Newcastle. Such a hypothesis needs as much proof as any other.

Mrs. Kathleen Brien (1935) describes Natal Smithfield types from Lion's River district, and gives a useful list of tools. This paper corroborates the abundance of "strangled scrapers", the occurrence of strangled endscrapers and hooked scrapers, and bears out the conclusion that the Smithfield N

series differs sufficiently from the Free State Smithfield to constitute a distinctive variant, "the ancestral form of this culture in South Africa." Mrs. Brien's guess is ■ good as Lowe's ■ Goodwin's, until additional evidence is forthcoming.

Microliths are described from Lion's River district, from Isipofu cave, the Umhloti district, Durban North, Red Hill, etc., mainly from open sites. These congeries include small endscrapers, thumbnail and circular scrapers. Two implements from Isipofu cave, one of soft micaceous shale, the other of lydianite, show signs of polish. This Isipofu site excavated by P. G. Brien (1932B) shows three layers, Bantu, preceded by Boakopoid (this purely physical type is identified ■ the evidence of one tooth and a vertebra), preceded by a Middle Stone Age level.

J. G. Cramb's paper (1934) on a Natal coastal site describes ■ "Smithfield" a series of tools that would appear from a careful reading of his paper to have no claim to that title. This seems to be normal midden material, not related at all clearly with any inland cultures.

Additional data on the Later Stone Age ■ available from a paper by William Bazley (1905) which describes the exploration of a cave in Alfred County. A top layer of soil, three or four feet thick, covered a second deposit of similar depth containing wood, charcoal, ash, burnt animal bones and broken human bones. A layer of loose stones (apparently placed there by man) covers the cave floor, then ■ three-foot layer of hard soil contains cores, flakes, grindstones and hammers. A large slab of rock was then removed and three crushed human skeletons recovered. Associated with them were thousands of scrapers, cores, flakes, etc., with a few "arrowheads and knives, mostly broken." The depth here was about 16 feet below surface. Some material was sent to C. H. Read, and should still be extant. The illustrations suggest Middle Stone Age elements, presumably from below the layer containing such Later Stone Age types as the grindstones, etc. The only *coup-de-poing* illustrated comes from "another district, many miles away." As Bazley ends his paper with the statement that he is about to excavate two other caves, every possible care should certainly be taken by the

Natal authorities to locate his sites and collections, and to attempt to republish his findings with additional illustration.

F. F. Churchill (1898) in a geological paper submitted to the South African Philosophical Society included various inhabited sites in the neighbourhood of Giant's Castle, the valley of the Little Tugela, Champagne Castle, the Tugela Falls, Mont-aux-Sources, and painted Bushman caves near the [redacted] of the Bushman's River. William Anderson, in charge of the Natal and Zululand Geological Survey, in his report of 1901 took up Churchill's interest, and both in the Introduction (pp. 9-10) and in the body of the survey (pp. 79-95) he speaks of inhabited sites in Natal. In a later report (1904) Anderson mentions the 20-foot raised beach near Cave Rock, Durban.

Two papers by Burnham King and Chubb (1932A and B) describe Later Stone Age implements from coastal middens [redacted] St. Lucia Bay, Richards' Bay, Sinkwazi and Umhali, with details of associated pottery, and an account of the excavation of a rock-shelter in the Drakensberg in the Singati valley. A paper by Schofield (1936) describes pebble tools from Natal coastal sites.

Ceramics

Pottery is described by Schofield (1935, 1936, and 1938) in what is virtually a single paper. His basic periods consist of (1) Pre-Bantu, which he here attributes to the Bushmen rather than to Hottentots, (2) Sotho types in the metal-using period, (3) Lala types in a metal-smelting period, (4) modern native pottery. These [redacted] elaborated as the series of papers continues, and finally he touches upon beads and fragments of engraved ostrich eggshell.

Further references to sites at Pietermaritzburg, Weenen, Zululand, etc., can be obtained from H. W. Fildes (1883), Goodwin (1928) or Goodwin and Lowe (1929). These sites and types [redacted] not included here.

We may presume that the Natal Zone, except for purely coastal material associated with the Later Stone Age, stops short with the Mount Currie buttress, and that south of this point the South-eastern Cape Zone begins.

VI. THE VAAL

Our present knowledge of the Vaal depends so fundamentally upon the survey undertaken by Söhnge, Visser and Lowe during 1935 and 1936 that there is no alternative but to make the fullest use possible of this study (1937) and to weave in additional points of importance or interest ■ we go along. The Memoir is basic to any future study of this area, ■ the survey included not only the main valley, but also parts of the tributary Riet, Harts, and half ■ dozen other rivers. There is thus reason to suppose that the evidence reflects the general history of climatic conditions in this section of our summer rainfall area, and that the wideness of the survey precludes any misinterpretations of such important factors in river history as the breaking of barriers, or local increases of precipitation or of catchment areas, such as might be (and are) credited with the creation or degradation of some of the deposits in the main river valley.

Of the various streams studied, the Vaal proper supplies the most valuable and complete data, providing the broad climatic background and painting in man's general relationship to those conditions. The various tributary streams yield detail; they supply the foreground and fill in what may be lacking or blurred by the turbulent history of the main river. From the evidence obtained from these sources the river gravels were grouped into the Older, Younger and Youngest series, each likely to contain several individual deposits representing various episodes, but broadly capable of being grouped under these three heads.

*Oldest Gravels**

When the survey was first undertaken the Older Gravels were thought to be pre-human and non-implementiferous; ■ recently this has been found to be incorrect. In 1941 the Abbé Breuil and Prof. van Riet Lowe differentiated ■ still earlier group (since termed the Oldest Gravels) that are poorly stratified, full of pebbles and boulders of diabase, and in places strongly calcified, which Dr. A. L. du Toit (in a

* My thanks are due to Dr. A. L. du Toit for his useful help in the preparation of this section.

note to be published shortly) considers to be largely of local origin. No artefacts have ■ far been recovered from these deposits.

Older Gravels

Despite their limited thickness these ■ widely spread, the pebbles being small, well rounded and polished, and usually of hard materials such as quartzite, chert, jasper, etc., set in ■ reddish-brown sandy or clayey matrix. Their form and colour have supplied local prospectors with the ■ "Red" or "Potato" Gravels. Where these rest upon the Oldest group a break ■ be made out in several places. Their extreme heights above river level vary from fifty feet to three hundred and fifty feet (at Bloemhof and Droogeveld respectively) but most deposits stand at some intermediate level.

These gravels were deposited over a flattish surface of aggradation by streams having rather low velocities, under an even though not necessarily high rainfall, during which strong oxidation of the material occurred. They ■ followed by red sand, possibly not of ■ age identical with that of the Kalahari Sands of Bechuanaland and Southern Rhodesia (see the appropriate chapter above) but doubtless a product of the ■ spell of aridity.

The first recognisable tools in this area had previously been observed at the base of the red sand, or lying directly on the surface of these Older Gravels, sometimes (so it was thought) even intruded into them under exposure or by disturbance. The existence of a Pebble Culture within these Older Gravels has now been established, though it has not been closely studied ■ yet.

It is evident that the store of hard, fine-grained pebbles composing these gravels could have supplied man with an excellent ■ of ■ material, and it is not surprising to find the surface of the Older Gravels ■ commonly strewn with artefacts, discards and blanks made by later tool-makers. In instances where these types are found resorted into the Younger Gravels they ■ the most heavily rolled.

In explaining the origin and position of these Older Gravels, A. L. du Toit speaks of a major rising of the central part of South Africa along the Griqualand West—Transvaal

axis, a slow phenomenon that affected the course and flow of the river. The superficial soils east of the river still remain (as can be seen from the appropriate Geological Survey sheets) while those to the west and north have been stripped and denuded by the side-slipping of the Vaal valley towards the south-east. This general period of uplift coincided broadly with the major period of rifting in East Africa. According to van Riet Lowe's reading of the picture, this episode of uplift and tilt was later than the deposition of the Older Gravels, and the river has slipped laterally to leave them isolated, some miles from the actual river bed.

The Younger Gravels

At the time when the survey was undertaken this Younger series (following the uplift phase) was thought to have far greater archaeological interest than the Older series, for in the Younger gravels stone implements occur with remarkable consistency and regularity, and almost all the known fossil remains from the Vaal — from them.

In wide valleys where the river has had a chance to meander, it has spread its gravels over a wide area, showing that these Younger gravels represent the results of deposition over a very considerable period. They show a terrace formation not only along the main river, but also along its tributaries, such as the Suikerbosrand, above Vereeniging, and the Klip. In general the materials composing the deposits are coarser than those of the Older gravels, suggesting a stronger river-flow. The wider range of materials present implies a somewhat different catchment area. Whereas we find the boulders of the Older gravels stained with iron, we find that in contrast the Younger gravels are cemented with tufaceous sand (i.e., sand bound together by cellular carbonate of lime).

On some stretches of the river three distinct terraces are represented, though at other places two or at times only — may be discernible. The vagaries of river history and the possibility that ancient barriers may have been ruptured along the course of the stream would account for this. The important evidence lies in the presence of three terraces. On the Windsorton-Vaal Estate all three can be recognised, at forty

feet, at twenty-five feet and at river level. The gravels of these three terraces were aggraded during three phases of a single wet-phase, which are here known as the first, second and third peak-rainfall periods, together forming the First Vaal Wet-phase, and each terrace was aggraded after its appropriate peak-rainfall.

In the various tributaries, such as the Harts, Bamboes-spruit, Klip and Suikerbosrand streams, these gravels may lie as much as fifteen miles or more from the parent stream, but the great proportion of the deposits lies within or near the existing river valleys. The greatest recorded height and depth of these Younger gravels are both at Gonggong, namely, sixty feet above the river, but filling channels that extend down to forty-five feet below the river bed.

The Youngest Gravels

A semi-arid phase followed the deposition of the Younger gravels, and was in turn followed by a humid spell, forming the Second Vaal Wet-phase. Precipitation was still sufficiently intense to erode the calcareous tufas, and to lay down the Youngest gravels. Remnants of these survive mainly in tributary streams, as the annual flood-waters of the Vaal have scoured out the course of the main bed. But even in the Vaal itself remnants persist, overlying the third or last aggradation of the Younger gravels. The Youngest gravels are very widespread, and contain both rolled and non-rolled examples of implements of Fauresmith type, so we have left the Stellenbosch series behind us. These were certainly made by — at a period contemporary with the formation of the gravels. The Riverview Estate provides the best section of the whole sequence.

Subsequent River-History

A later semi-humid period buried the Youngest gravels under a protective layer of twenty feet of sand and silt. The close of this episode is marked by the appearance of Fauresmith II. Then came an arid period, marked by high winds which scoured the soil by their subaerian action.

A Third Wet-phase of minor importance followed. It was only sufficient to accumulate grits, sands and clays, with

laterite (concretions of iron oxide and sand) in the tributary streams. This Third Wet-phase agrees in time with the Middle Stone Age, and is followed by a semi-arid spell that leads into existing climatic conditions and is associated with the Later Stone Age.

Industrial Horizons

So much may be said for the broad climatic background, but how do the various industrial horizons fit the picture?

At Vereeniging, where the Older gravels stand about 80 feet above the river, they have now been found to contain a large series of Pre-Stellenbosch tools. The gravels at about 50 feet (and actually lower in relation to the tributary Klip) follow the earth-movement phase and include Vaal-Stellenbosch I (Clacto-Abbevillian) with phases A, B, C, and D, according to Breuil, on whose authority we can link the earlier deposit with the 95-metre (300 foot) Sicilian Beach at Caanblanca on the coast of Morocco and with similar deposits on the Portuguese coast. The Sicilian beach level is generally linked by geologists with the Gunz glaciation in higher latitudes. At Holpan (Klipdam) the Older gravels — about 200 feet, contain Pre-Stellenbosch tools (Vaal Kafuan) and at a later level Late Kafuan tools appear, while lower still an even later phase of that industry is represented at from 50 to 80 feet above the present level of the river at that point. The distribution of this whole series of Older gravels seems to have been the result of the period of tilt and uplift. (Breuil 1943A and C).

Rolled Pre-Stellenbosch types from the Older gravels — found redistributed in the Younger series. Rolled and non-rolled Stellenbosch I tools, showing the Abbeville technique, are found to have been made during the earliest accumulations of these Younger gravels.

Gravel II, associated with the second aggradation, yields the most abundant remains. These are of Stellenbosch III types, and they occur rolled or non-rolled — various levels. There is no doubt therefore that this is an extensive cultural phase, belonging to the Second Peak Rainfall of the First Vaal Wet-phase. The Canteen Kop gravels (Goodwin 1933) belong to terrace II, and the site — used by people making

Stellenbosch III tools during the period of building, and making Stellenbosch IV tools after the aggradation.

Gravel III (third aggradation) shows Stellenbosch IV tools. Here van Riet Lowe was able to observe both implements and factory débris, non-rolled and rolled, and both in and immediately upon the gravel. On the Younger gravels at Larsen (Appendix B) he observed ■ fifth phase of the Stellenbosch series, producing minute and beautifully formed *coups-de-poing*, following the end of the first Wet-phase.

We may summarise the somewhat complicated relationship of climate and the Vaal Stellenbosch before we go on to discuss later developments:

- V. Stellenbosch V.: On Younger Gravels at Larsen. Post Wetphase I.
- V. Stellenbosch IV.: During deposition of Gravel III. Third Peak-rainfall.
- V. Stellenbosch III.: During deposition of Gravel II. Second Peak-rainfall.
- V. Stellenbosch II.: After Gravel I, before Gravel II.
- V. Stellenbosch I.: Throughout Younger Gravel I. First Peak-rainfall.
- V. Pre-Stellenbosch series: In Older gravels, with Kafuan and Clacton facies.

Following the Vaal Stellenbosch, we find the earliest occurrences of Fauresmith I tools to be ■ the eroded surfaces of the calcareous tufas that lie ■ the Younger gravels. They are to be found both non-rolled and rolled in the Youngest gravels, where they had obviously been resorted during the Second Wet-phase. The tufaceous limestone mentioned covers the third and last gravel of the Younger series to a depth of 22 to 40 feet. One section ■ Windserton shows the following sequence: Five feet of surface sand, containing Fauresmith I tools, overlying 40 feet of calcified tufa in which ■ highly developed Stellenbosch V is found, finally deteriorating and followed by ■ early Fauresmith. This heavy deposit overlies Stellenbosch III in the appropriate gravels.

Earlier, and often important material from the Vaal gravels can be found under such names as E. C. N. van Hoepen, T. N. Lealie, J. P. Johnson, etc., in the 1935 bibliography.

Development of Earlier Stone Age Technique

Goodwin (1933D) describes various techniques employed in South Africa during the Earlier Stone Age, and shows that the intermediate stages between the techniques of the Chellean (Abbevillian) and the Levalloisian (which are doubtful or absent in western Europe) were widespread in certain other parts of the world, and constituted a logical development that can be clearly seen and recognised in South Africa.

Reygasse's side-flake technique of Tachengit is shown to be a normal African method of obtaining wide flakes as blanks for the making of *coups-de-poing*. We have at Victoria West, and more clearly and abundantly in these Vaal deposits, evidence that technique was adapted to whatever kind of material was most readily available. A series of at least five stages is described:

- (1) The Abbeville technique, employing small river-pebbles which were trimmed directly to shape.
- (2) The use of a wide flake struck directly from a river pebble or boulder and trimmed.
- (3) The use of a series of flakes struck from standing rock, the most suitable being trimmed to shape (Tachengit phase).
- (4) The employment of a carefully prepared ~~stone~~ (often from river pebble sources) ~~stone~~ prepared as to permit the removal of a single wide flake, which could be trimmed to suitable shape. This is the direct precursor of the Levallois, and even in early stages the striking platform is prepared for the removal of the desired blank.
- (5) Normal Levallois, approximating to that of Europe.

Two later technical stages (the Mousterian point, and perhaps the chronologically separate Grand Pressigny) are suggested as part of the same evolution, without much consideration for African examples. A later paper by Lowe (1945) is an elaboration on much the same lines. This development seems to belong integrally to Stellenbosch III and IV as understood on the Vaal, and seems largely associated with the material belonging to and included in the second aggradation of the Younger gravels.

Lowe's later work on the final phases of the Vaal Stellenbosch shows that there are various small (one might almost say minute in relation to the expected size) *coups-de-poing* in the fifth stage in the Stellenbosch, which do not link directly with the Fauresmith evolution that follows later.

The Middle Stone Age

As is to be expected, there is evidence at certain sites that the Middle Stone Age follows the Fauresmith²¹. Generally where Middle Stone Age tools do not occur on the surface, they are to be found in the subsoil in beds of laterite and grits, from a few inches to perhaps a foot in depth. It is obvious that here (as elsewhere) the whole pattern and weave of the Middle Stone Age is very complicated. The Vaal has certainly provided a major highway throughout its whole history, traversed and decussated by pathways that have varied in importance from time to time, but have constantly brought new ideas and developments to this main stream of human movement. This whole period demands a separate monograph, but in general the Middle Stone Age is characterised in the Vaal by a number of variations, depending primarily upon three characteristics:

- (1) A Levallois technique, yielding typical flakes struck from "tortoise cores".
- (2) Convergent longitudinal flaking, conforming to the general "point" family of techniques and tools.
- (3) The usual (though not consistent) use of a faceted striking platform, and hence of a faceted butt on the blank or finished tool²².

The earliest phases of the Middle Stone Age certainly include bi-faced handaxes and large, high-backed tortoise cores, but in this Age advances in become somewhat smaller, and a general refinement of technique is evident. It may prove useful in future studies to differentiate more

²¹ A detailed account of this extremely important series of tools is awaited.

²² It is essential to note here that it was only when a core reached the stage at which likely blanks could be struck that the platform was prepared; so that in trimming-flakes, used to shape the core, the platform will be plain.

clearly within the Middle Stone Age series, between long flakes, short flakes, and flakes which have received any secondary working whatsoever on the under face.

The Later Stone Age

Lowe²³ divides the Smithfield series here into four phases, using the figures I, II, III and an anomalous VI. The first three have been described elsewhere under the — usual subdivisions A, B, and C. The last is of greater interest to us here. It shows all the Smithfield III elements, with additional material that resembles the Rhodesian Wilton, and tanged arrowhead with careful pressure flaking over both faces. Leaf-shaped arrowheads show the same technique, while single-barbed arrowheads of simpler type occur. These resemble slender flakes with a basal notch. One example of a polished conically pointed arrowhead is known. While this phase is developed from about twenty-four sites in the Barkly West and Fauresmith areas, it is not yet — a satisfactory basis. Material from Thabanchu shows affinities, and Dr. C. H. Heese has described a site — Britstown with distinct similarities. This series needs careful watching, especially in the light of associated material and stratification. In other papers Lowe seems to have dropped the curious (and purely geological) use of numbers for the Smithfield types, and reverts to Smithfield A, B, C, and P (Pondoland) and N (Natal), which seems more satisfactory, as it will permit of numerical development locally to describe local stages.

Remains of Wilton facies are abundant from surface sites. Here the most characteristic local tools are the backed blade, lunate or "single crescent". "Double crescents" (or double-arcs) so common elsewhere, are — far unknown on the Vaal.

This résumé has carefully avoided much of the more contentious matter dealing with terminology, mainly as it is evident that many of the changes there suggested have been found to be unsatisfactory by Prof. C. van Riet Lowe himself, and have seemingly been abandoned. The student is referred to the original Memoir for illustrations and sections, and for charts (especially that — page 132 of the Memoir).

²³ In Sèhunge, Visser and Lowe, 1937.

Since the publication of the Memoir more work has been done — the Vaal which has only been touched on here, and readers are advised to read papers by Breuil (especially 1943A and C) and Lowe published since the appearance of this important publication. The Abbé has been able to provide help, in the light of his own work in Mauretania and Portugal, which could be given by no other archaeologist. It will have been observed that little is said here concerning earlier work on these gravels. This has all been covered in Goodwin (1935) and, in spite of having considerable historical value, little — need be added here.

SOUTHERN BECHUANALAND

Little is as yet known of this area, apart from two papers — the Wonderwerk cave, near Kuruman. (Malan and Cooke, 1940, and Malan and Wells, 1943.) Here a few fragmentary Later Stone Age tools (Smithfield) and reworked flakes suggested the presence of Middle Stone Age elements were found on the surface of a cave near Kuruman containing a series of paintings. Other examples show that Levallois flakes were made by some of the inhabitants. Below this disturbed deposit are Fauresmith tools to a depth of three feet.

In the stratified deposits a very rich industry of Smithfield A tools — encountered, of banded jasper and chert. From this — it should be possible to obtain a clear view of what the Smithfield A (van Hoepen's Koning Kultur 1926) really consists, as we have generally only been able to get our information from surface sites before this excavation. Much still remains to be described from this cave, but the work of description needs thought and care, — especially — this is an area somewhat off the beaten tracks of archaeology, and therefore likely to throw essential sidelight upon material further east.

An earlier paper by J. P. Johnson (1906) describes implements from various sites in the Herbert, Hay, Campbell, Prieska and other districts, and from the Abestos Hills. The paper is well illustrated, and is certainly worth reading by anyone working — this general area.

VIA. WESTERN FREE STATE

The migration routes to and from the Western Free State seem to have been intimately connected with the highway of the Vaal River since the end of Stellenbosch times. Before that moment the position is less certain, as we know remarkably little concerning the Stellenbosch culture in most of the Free State. It is perhaps possible that conditions — not attractive to man, so that no great population of these cleaver-and-hand-axe peoples existed away from the Vaal valley.

J. P. Johnson, a geologist by training, probably did more for our understanding of the old Orange River Colony than any early investigator. His work here was eventually epitomised in a single volume, "Geological and Archaeological Sites in Orangia" (1910A), though much of the material was also included in his better known book, "The Prehistoric Period in Southern Africa", reprinted in the same year. In these volumes there is little of real interest — the Earlier Stone Age, but several Smithfield ■ sites (included by him under the comprehensive term, "Solutric") — described, from Boshof, Petrusburg, Rietpan, Bloemfontein, the junction of the Riet and Modder Rivers and other sites — the Vaal and in the western Free State. He associates Smithfield C tools with petroglyphs at Koffiefontein, Biesjesfontein, etc. It is obvious that in this inchoate stage of our knowledge, Johnson left much undone, and that his conclusions suffered constantly from lack of contact with trained prehistorians; but his work was of extreme importance to the areas he studied. This ■ foundation work, and can only be criticised on the grounds that it could not reasonably foretell the structure which it would eventually uphold. Many of the sites made famous in later years were originally described and discussed by him.

Also important, though not so fundamental, is a paper by E. R. Collins and Reginald Smith (1915) which covers a wide area, including parts of the Free State. This gives ■ useful information on the geological deposits — which man's tools were found. Several Smithfield sites, perhaps — Fauresmith site, and material from the Hagenstad baths, — all discussed.

Following this pioneer work came a series of papers by C. van Riet Lowe, which made this whole area his own by right of conquest. These papers have tightened up our knowledge, augmented the known sites very considerably, and have certainly given an appetite for more work of the same standard from the same hand. He has shown this to be the heart and focus of the *lydianite area*. While indurated shale persists well outside this region, more especially to the south and south-east, there seems to be abundant evidence that at three periods of man's history, the lavish presence of this excellent material was important enough to dominate man's culture sufficiently to force an amazing efflorescence of culture in the Orange Free State. This showed itself in an over-abundance of tools and sites of human occupation that have rendered this a difficult area to comprehend. Here indeed it is almost impossible to see culture and period for the implements.

While the Stellenbosch culture is relatively rare, Lowe (1931D) could give the general sequence of cultures here as follows, reading from below upwards:

Middle Smithfield (B)
Lower Smithfield (A)
Middle Stone Age
Fauresmith
Late Stellenbosch
Early Stellenbosch

While he himself has augmented this simple outline, mainly from the stratified deposits of the Vaal River briefly described above, the general sequence remains much the same. The original description of the Fauresmith culture came from the Free State (Goodwin and Lowe 1929), based upon material found by Mr. Max Levisier on the farm de Put, near Fauresmith, and other sites located by van Riet Lowe, though considerable developments were given in other papers by that writer during and subsequent to the Vaal-River survey.

Our most abundant evidence on the Middle Stone Age — from a series of associated sites some twenty-five to thirty miles north of Bloemfontein. Our first information comes from a paper by Broom (1913A) and a short note by Péringuey (1913B). Broom describes the association of *Egæus*

capensis, *Mastodon* sp., *Phacochoerus aethiopicus*, *Bubalus bainii*, *Connochaetes antiquus* (sp.n.), *Taurotragus oryx*, *Cobus venterae* (sp.n.), with Middle Stone Age implements in the Hagenstad springs. Several later papers have dealt with this area and the associated deposits. Dreyer and Lyle (1931) have described additional fauna, and Dreyer (1938) has given an account of the implements found in general association with Florisbad man (*Homo helmei*). These may be linked with two papers by van Hoepen (1932C and 1940) describing his "Mosselbaaise kultuur", later spoken of under the terms Mazelspoort industry and Swartfontein industry. All these papers refer to much the same complex, whether all the material belongs to a single phase or stage, or not. The whole position is considerably (though not completely) clarified in a symposium by Wells, Cooke and Malan (1942), who describe a group of points, — worked on the underface, lance-heads, etc., from Vlakkraal. This group of papers is of very considerable importance, especially as it reviews most of the previous evidence (excluding Collins and Reginald Smith). While much has been written on this series, it — hardly likely that this culture covers the entire Middle Stone Age in the Free State, and a better understanding of the Modderpoort material from the Eastern Free State should throw much light — man's story — the Vaal.

The Later Stone Age here has been covered adequately and well by van Riet Lowe (Goodwin and Lowe 1929) in a paper that is a classic example of a first class local survey; often written under almost impossible conditions. Here a very complete picture of the Smithfield culture is given, though perhaps including one or two tools that would probably be considered to-day as belonging to the Middle Stone Age. Any understanding of the Free State must include a thorough knowledge of this paper.

Throughout this area, — Johnson, Burkitt, van Riet Lowe and others have shown. Smithfield B implements are consistently associated with petroglyphs on open sites. This does not mean that the petroglyphic art started with the bearers of the Smithfield culture, but only that the culture covered a part of the long story of rock peckings.

The Smithfield C phase seems to have flourished here, as further west, and — though a solitary crescent of Wilton type may occur — open site, it does not necessarily mean that the bearers of Wilton culture were any more typical inhabitants of this — than were the makers of the delicately fashioned tanged arrowpoints described by van Riet Lowe in his section of Söhngé, Visser and Lowe's "Survey of the Vaal River Basin" (1937, pp. 96-98).

VII. LOWER ORANGE

There is not enough known concerning this area to permit us to make any judgments of value. Scattered finds of bored stones, etc., are known, but I can find no publications — this area. It is probably an offshoot of the Vaal River area, linked with Southern Bechuanaland by the Kuruman-Molopo river system.

VIII. THIRSTLAND

When we consider the vast extent of this territory, stretching as it does from the Atlantic coast to the Sneeuberg range, remarkably little has been written and published. Dunn's work, covering the western part of the field, between the Cape Mountains and the Orange basin, gives some interesting material from the Zak River district, and the Kaaienveld. This work is not adequately documented, and no deductions — to age — distribution can be made, so it has been included in the historical introduction, and reference can be made there, and to the works themselves, for the main outline of Dunn's investigations. Most of our more recent knowledge comes from the Victoria-West-Britstown area, the Middelveld and Winterveld; a part which is still under the domination of the Vaal River, belonging perhaps more intimately to that complex than to anything further to the south. It is even possible that the Middelveld should at certain periods be regarded as part of our — VI, and that the Thirstland should only start with the Trekveld —

Earlier Stone Age

A pioneer here — the Resident Magistrate at Victoria West, F. J. Jansen. His interest — aroused by the presence

of large worked fragments of stone, closely resembling certain weathered fragments from the dolerite hills, but suggesting human workmanship. Somewhat guardedly he submitted examples to Reginald Smith at the British Museum, and the latter (1919) published a short report on the material. Jansen continued his studies on the spot, and eventually gave an excellent description of the material recovered from hill-talus and alluvium (1926). This was our first detailed account of the Victoria West implements. Jansen describes three different forms of the well-known Victoria West core: the uncinate, the horse-hoof and the high-backed forms. The reading of this paper and the interest the finds aroused led to the appointment of a commission by the South African Science Association to discover what demarcation was possible between artefacts and natural rubble. Messrs. Heese, Jansen, and Goodwin visited a variety of sites at Victoria West, above that town in the ancient beach of the old lake deposit, at Melton Wold, Vingerfontein, Zuurkop and other sites. The report was eventually published as a chapter in Goodwin and Lowe (1929), where it was pointed out that finds occurred in deposits which included Stellenbosch *coups-de-poing* of fairly advanced type.

The extreme weathering of this material at Victoria West proper has always been a stumbling block, and even as late as 1934 the Rev. W. G. Sharples finds difficulty in accepting the division between rock-spalling and human workmanship. The paper has its value, as it draws attention once again to the necessity for differentiating clearly between natural insulation and spalling of dolerite (which are here peculiarly misleading) and human action, governed by the intention to create a specific form. The whole matter has since been so abundantly clarified by discoveries in the Vaal gravels²⁴ and the position placed in such clear perspective in relation to the Vaal Stellenbosch, that there is no further room for doubt.

Other papers include a reply by Dr. C. H. Heese (1936) to remarks by van Riet Lowe (1935C) on the general relationship between Fauresmith and Belgian Congo material. Heese's paper gives his deductions from sites at Hopetown, Britstown and Brandfontein.

²⁴ Goodwin, 1933 D.

A later paper by Sharples (1938) describes an abundant factory site at Steenkampspoort, near Fraserburg, apparently covering the change-over from the Stellenbosch culture to the Fauresmith.

Later Material

The Middle Stone Age is broadly covered by a paper on the petroglyphs at Vosburg (Goodwin, 1936). The earliest implements recovered (apart from the finding of a single Fauresmith *coup-de-poing*) belong to the Alexandersfontein variations; short, small, heavily weathered Levallois flakes and points, which were somewhat localised in ■ part of the area. The next phase consists of an industry not described from elsewhere, and therefore named the Vosburg industry. Although the condition of the implements suggests that this is an early culture (quite probably late Middle Stone Age) associated with ■ early phase in the making of petroglyphs, more evidence (if possible from a stratified deposit) is needed to clarify the position in relation to broader chronology. Here it certainly belongs to a period between the Alexandersfontein and the Smithfield series. This latter is abundant, and covers a long period of time if patination can be regarded as a criterion. The Vosburg industry includes burins, abundant small polyhedral cores of elongated shape, circular scrapers, endscrapers, small triangular points, small discs, etc. While the technique of parallel flaking suggests Nanthropic influence, the industry is certainly early.

Additional papers from this area are mainly by Dr. Heese, who gives accounts of the distribution of the burin (1932A, 1934A, 1935) here and on the south coast. His persistent search for polished tools has supplied us with a series of papers which should prove important in any future evaluation of the Neolithic influences which are certainly widely present in our Later Stone Age. (Heese, 1926, 1936.) A paper from the same hand (1934B) on the discovery of ■ Middle Stone Age flake bearing the drawing of ■ small female skirted figure from Doorsekuilen in the same general area, suggests that we have direct proof of the age of our petroglyphs. The paper does not take sufficiently into account the fact that in order to incise such a figure on a flake, the flake

must first have been oxidised and patinated sufficiently to permit of engraving. This important consideration should be applied to all finds of implements bearing engravings. To Dr. Heese must be credited the finding of tanged implements of relatively recent date in the Britstown area. These are in indurated shale and show no patination.

IX. UPPER ORANGE BASIN

This area is somewhat interrupted by the presence of Basutoland, from where the minimum of information is obtainable. Prospecting of any sort is heartily disliked by the native chiefs, and it is difficult to get material of an archaeological nature from a country where this restriction inhibits freedom of action.

Although several early workers, notably Alfred Brown and Dr. Kannemeyer, lived and worked in the Upper Orange basin, they have left very little information in printed form. Alfred Brown's only known publication on implements is quoted earlier in the historical introduction to the present Handbook, and Kannemeyer's contribution is very fully given there also. This latter publication seems to have supplied E. B. Hartland with the material for a paper in 1907, which has little real interest apart from providing ■ easier access to Kannemeyer's work.

Earlier Stone Age

The Earlier Stone Age has been dealt with in two papers by Macfarlane on the geological changes that have occurred in this general area. In the first of these (1942) he discusses the high-level gravels on the Little Caledon River near Maseru, and then treats more fully of sites five miles from Mohale's Hoek, on the Kornet Spruit, ■ seasonal tributary of the Orange, with a normal flood level at this point of 15-20 feet over a width of 80 yards or so. He concludes from his evidence that ■ crustal movement during Upper Pleistocene times, coincident with an Upper Levallois culture, occurred here and is indicated by the faulting on the Kornet Spruit. He regards the deposits themselves ■ relatable to the High Level (Older) gravels of Söhnge, Visser and Lowe on the

Vaal River, which are there regarded as of Upper Tertiary or Early Pleistocene date, but Macfarlane is here certain that he is dealing with very much later implements. While the association of implement types can be accepted as valid, more remains to be done before the suggested relationship between these gravels can be conceded. The Kornet Spruit deposits fail to produce evidence of climatic variation during their period of aggradation, and changes in the deposition of silt — be referred to changes in local topography and drainage, due ultimately to crustal warping. He goes into the question of the affinities of the implement types, and suggests that there is a hiatus extending over a considerable period, separating the local practice of the Levallois technique into two.

Macfarlane (1944) deals somewhat similarly with high-level gravels on the Upper Orange in the Aliwal North district, and again he shows himself a keen observer of geological phenomena. He brings evidence to show that uplift along an axis, accompanied by local faulting, led to a change of course in the Aliwal North section of the valley during the Fauresmith period. This was accompanied by a ponding back of the river, so that the later silts were deposited. The axis of the uplift crosses the Orange at a point which he defines. The action — simple, and apparently the result of vertical forces only. In making his geological deductions, Macfarlane stresses the importance of Leakey's statement that the Nanyukian, of analogous date, was also accompanied by earth movements in parts of the Great Rift valley in Kenya.

Later Deposits

The Middle Stone Age site at Rose Cottage still awaits publication, but it should certainly reveal some extremely important facts concerning the ramifications and local sequences of the Levallois and Mousterian techniques.

A paper based upon the work of J. W. Eddolls and a subsequent visit by B. D. Malan (1942A) to several sites in the Modderpoort area, resulted in an adequate and well illustrated account of material from the Upper Caledon valley. The series shows general relationships with material from Mazelspoort and from Vlakkraal, described by van Hoepen, and while the facies are not identical, this

general complex appears to be widely distributed in the eastern Free State and Basutoland. Until Rose Cottage yields more detailed and extensive publication it is not possible to place the exact stratigraphy of this very advanced Levallois series in its relationship to other material.

Kannemeyer's paper (given in the early part of the present Handbook) should be studied for local information ■ the Later Stone Age, also references in Péringuier (1911) and in Goodwin and Lowe (1929). Burkitt has some remarks on Aliwal North, more especially on paintings.

A protohistoric grooved stone is described by P. W. Laidler (1938) from the Aliwal North district. It consists of ■ barrel-shaped, longitudinally bored piece of micaceous sandstone, along the ■ side of which a U-shaped groove has been rubbed. The boring has been done with a metal rod, and is less than a centimetre wide at one end. This is a common type of bore in the protohistoric period here, though more usually associated with dagga-pipes, etc. The borer generally used is of fencing wire, so this is probably a transitional Bush-Bantu implement of recent date.

MIGRATIONAL ROUTES

For the first time on the long trek southward there is a relatively easy path from this region across the mountains to the Transkei and the South-eastern Cape. While the bored stone provides us with evidence that the Basutoland mountains could be crossed by way of the Upper Orange and the Quthing rivers, it is more probable that the main highway to the south-east was from Aliwal North and Herschel district, through Wodehouse to the narrow gap at Dordrecht, and thence to Glen Grey district and Queenstown, and to the Great Kei. An alternative route would pass through Cradock and along the Great Fish River. The importance of the extension of the indurated shale area towards the coast at this point must be stressed: but not over-stressed. While the material certainly provided a continuum of technique and morphology when used by peoples from these routes, it must not be forgotten that implements made in this lydianite by people passing southward from Natal along the coast must necessarily have

approximated to some extent to inland types. This area is ■ cross-roads, and will always have to be dealt with as such. The barrier provided between Natal and the South-eastern Cape at Mount Currie and Mount Ayliff is by no means so difficult as that barring the way from the Free State to Griqualand East.

X. SOUTH-EASTERN CAPE

In time it should be possible to sub-divide this area (as in Natal) into an inland section and a coastal belt, with perhaps a similar division for the Transkei. At present this is not possible as information is quite inadequate. The inland portion, including Middelburg, Queenstown, Cradock, etc. presumably shows closer affinities with the Upper Orange, while nearer the coast more definable impacts from Natal by way of the Transkei are to be expected. Just as in Natal we differentiated between the belt above 3,000 feet, but permitted intrusion down the main rivers, so we shall have to think in broadly similar terms here, taking cognisance of the important local rivers which fan out to points along this coast.

Little very definite is known of the regional climatic history. A paper by Dr. P. W. Laidler (1934) purports to give some generalisations on the position; but there is much that is misleading, and the positive evidence quoted is quite inadequate to permit of important deductions such ■ he has made. We may start ■ short survey by quoting his results. Laidler sets out to relate archaeological and geological phenomena, mainly using pluviation ■ his guide. He quotes Macfarlane's high-level gravels at Amalinda, Dr. Rattray's unpublished deductions concerning Summerspride, and McLoughlin's Umtata deposits. He finds ■ sequence between the Stellenbosch and the Fauresmith at Bonza Bay, and describes Middle Stone Age types from that site and from the Blind River. He divides his Middle Stone Age into long, slender types with faceted butts, struck from a carefully prepared core, and ■ contrasting shorter blade, with generally a single facet ■ the striking platform. Laidler concludes somewhat curiously that the Stillbay continues and intrudes into the Wilton, ignoring any intervening Howieson's Poot.

stage. This is one of the many points that needs to be cleared up locally. His rough and ready climatic chart (leaving out the deposits he quotes, and the casual cross-references to the glacial periods), is as follows:

- Stillbay and Late Wilton: Modern dry period.
Middle Stone Age: Period of high seas and heavy rains.
Followed by dry period; seasonal rains.
Fauresmith period: Decreasing rainfall, and contracted seasonal vegetation.
Stellenbosch period: Wet.

In conclusion Laidler states that "The evidence of pluvial periods in the Ciskei and Transkei is associated with certain archaeological evidence. The Fauresmith culture . . . is shown to be widely distributed, even to the seaboard, with a Levallois technique present. Further, this culture is shown to evolve from a Late Stellenbosch and into Middle Stone Age, of which a graded series was found at Bonza Bay. The excavation of a Transkeian cave produced further evidence of the course of evolution of the Middle Stone Age, showing that high-backed, parallel flaked lance-heads, with resolved flaking, preceded leaf-shaped secondarily worked blades."

Earlier Stone Age

An early paper by D. R. Macfarlane (1935) discusses the important presence of Pre-Stellenbosch implements *in situ* in East London and Bonza Bay. The implements come from various brickfields at Stony Drift, the Municipal brickfields, Brown's brickfields, and a brickfield near the native cemetery, — the right bank of — tributary of the Umzabanga. From these sites he describes hemispherical scrapers, core scrapers, rostroid scrapers, rostroid handaxes, rostro-carinate handaxes, cleavers, awls and crude points, trimmed points, etc. He suggests that the "Amalindan culture" preceded — pluvial period, and correlates the climatic development presumptively, with the Kammasian of East Africa. He compares this Amalinda material with the types found by him at Bonza Bay.

Earlier Stone Age material is rarely described, though examples — known from various sites in this general area. A. G. Macloughlin (1933) describes the general stratification of various Middle Stone Age sites in relation to the earlier

period, and his results may be summarised thus, reading from below upwards :

Smithfield ■ and C
Smithfield A (Koning)
Middle Stone Age
Early Mousterian
Fauresmith

Similarly P. A. W. Cook (1931) briefly discusses implements found by him in the Healdtown area. He finds Stellenbosch, Fauresmith, Glen Grey, Smithfield C and a "crescentless Wilton", from five sites in the neighbourhood.

Dr. J. Hewitt (1920) draws attention to implements in ironstone gravels near Grahamstown, including flakes and *coups-de-poing*. The remainder of the paper discusses middens, pottery, etc., and finally develops into a paper on physical anthropology. (See also Hewitt and Stapleton, 1925, quoted in Goodwin, 1935.)

Middle Stone Age

A further paper by Macfarlane (1936) describes "pseudo-Mousterian" techniques, producing giant pointa, developing parallel with a true Levallois which shows three phases locally. The Old Levallois ■ to exist side by side with Upper Stellenbosch material, and the implements are related to raised-beach deposits at Blind River, and to a period of local earth-movements accompanied by a generally warm climate. Other sites are quoted and discussed in corroboration. These sites probably mark an early stage in the Middle Stone Age, and many of the Levallois flakes (allowing for material) are curiously like specimens from the Somme gravels.

A descriptive paper by Hewitt and Stapleton (1925) discusses the antiquity and nomenclature of South African implements, and the writers point out that "In correlating implements from different regions, allowance must be made for the possibility of convergence due to independent evolution, and of divergences due to differences of material." This paper also stresses the importance of the study of distribution as a clue to prehistory. Various implements are described, including "quarter of an orange" types (see Lowe 1931A) and the distribution of Stellenbosch materials in the

Eastern Province, for instance, ■ Middeldrift (cf. Goodwin and Lowe, 1929). Grahamstown, Sugarloaf Hill, Gowie's Kloof, etc.

Laidler (1933) describes a contorted raised beach deposit at East London (evidence given later by Macfarlane in the paper quoted above) and an early development of the Middle Stone Age which he relates to the Fauresmith, lying immediately below the beach. Below this stratum is ■ layer of true Fauresmith, predicting Mousterian affinities and influences. Stratification in ■ cave in Nqanakwe district shows the following order: Bantu on surface, overlying Smithfield B and C, this in turn overlying implements with Mossel Bay affinities. In another cave he gives three horizons, the uppermost is normal Smithfield B, the middle layer is similar, but shows distinct differences, while the lowest seems to show Smithfield C. Dr. Laidler's somewhat superficial attention to scientific method in dealing with deposits and with material retrieved, may possibly be blamed for this reversal of the more usual and likely stratification.

Two papers by Stapleton and Hewitt (1927, 1928) give our first account of the Howieson's Poort material. This shelter contained no midden, but presented ■ single cultural group. The most noticeable tools are large crescents, pointed blades, hollowed flakes and scrapers, rod-scrapers and lance-heads. A note by Burkitt is added. The culture is further defined in the second paper where some evaluation of the relationship between this and other cultures is suggested. The writers regard the culture ■ partly contemporaneous with Wilton material on the grounds that the large crescentic scrapers are analogous with the microlithic Wilton types. On the other hand, they suggest ■ link with the Still Bay types, through the lance-heads.

Interested primarily in the development of technique, Hewitt (1933) is struck by the consistent presence of a trick of working ■ the underface of flakes, abundantly evident from this area. He collected and arranged flakes from Stillbay, Howieson's Poort and Wilton deposits showing this tradition of workmanship, and makes out ■ good case for the continued local persistence of this old technique.

Harcus (1942) briefly describes material from midden sites near Port Alfred and from the areas between these. Mixed Wilton and Middle Stone Age types from this area are discussed. The sources are mainly isolated patches between dunes. The bulk of the material consists of microliths in a variety of different stones, quartzites, silcretes, lydianites, etc.

Later Stone Age

An important paper (Chubb, King and Mogg, 1934) on a carefully excavated site at Umgazana, ten miles south-west of Port St. John's, reveals an interesting variant of the Smithfield family of cultures. This has very distinct affinities with the Natal material (described elsewhere by Goodwin, 1931) and is related to types from Cofimvaba (McLoughlin, 1933) and from East London. There seems a sufficient reason to assign it to the Smithfield A of the Free State, and "a new variation", the term applied by the excavators, is the most suitable description.

Bone tools occur throughout the major part of the deposit, while pottery is late. Burins occur, somewhat unexpectedly, and notched scrapers, side-scrapers, stone rings and a variety of other forms complete the assemblage. This paper is of considerable value to anyone working on the Smithfield variants, especially in this Transkeian area, which is so little known and understood. The evidence suggests strongly that, as in Natal, forms and types of workmanship that disappeared early in the Free State (Smithfield A or Koning) persisted here to a late period when pottery appeared. Lowe's conclusion that "time may reveal that a definite culture, based upon this variation, existed over an extensive area" is an important one, and should be borne in mind in all our dealings with this crossroads area. We may speak of this phase as the Smithfield P variation. (For pottery, see Schofield, 1938A.) It is essential that a wide and representative series from this site be made locally available for direct comparisons within this region.

Laidler (1936) describes a cave site in the Ngcisininde valley, twenty-one miles south-east of Tsomo, in the Nqamakwe district, containing remains of paintings. He

gives the following chronological succession, to be read from below upwards:—

Two phases of Smithfield P (Umgazana type).

Mid-Ezolo types.

Transkeian duckbills, and triangular types. Worked bone.

Material with Lower Capsian affinities (?).

Lower Capsian affinities, backed blades and shouldered scrapers.

Combined Middle Stone Age and Capsian.

Somewhat curiously, considering that we are dealing with a stratified — deposit, Laidler states that "the close association of pottery with stone implements is no — proof that the same people made both, than it could be a proof of their manufacturing the European and Oriental beads occasionally found in association." This is a curious and dangerous half truth. Unless pottery can with certainty be attributed to an outside source, it must be accepted as "associated". Dr. Laidler suggests a curious reversal of the onus of proof.

Most of Dr. Hewitt's papers describing types in the Albany Museum have been discussed elsewhere (Goodwin 1935) and, though important, need not detain us here. A more recent paper (Hewitt 1934) describes pedunculate arrowheads from de Hoop farm, Thabanchu, Platrand farm, and a fragment from the Windmill site at Thabanchu. A small (2 cms.) bi-faced arrowpoint of leaf-shape, comes from Khabanyana farm. These are all probably Later Stone Age, though one (from de Hoop) suggests possible Middle Stone Age affinities. In the — way, two small tanged arrowpoints from Likhatlong of about the same length, suggest that one is Middle Stone Age and weathered, while the other is Later Stone Age and unweathered. The general associations are with Smithfield B, C and Wilton, but this is inconclusive. It would seem likely that we are dealing with two separate tendencies towards pedunculate points; the one a Middle Stone Age tendency, possibly linking distantly with the North African Aterian; the other linking just — distantly with the Saharan Neolithic of Fort Flatters and elsewhere. Lowe's short chapter on tanged types in Söhnge, Visser and Lowe should be read in conjunction with this descriptive

paper. Smithfield A types — discussed from Cradock, Cofimvaba, the Bashee River, Umgazana, Port St. John's, Canon Rocks (Alexandria) etc. Much of this material should now be attributed to the Smithfield P series, rather than to the Free State sequence.

Dr. Laidler (1935B) has made a brave attempt to evaluate the shellmound cultures of this general area and describes various midden elements. The paper is suggestive, but is not sufficiently securely founded to be of great value to future workers. He suggests twelve series of middens. The first three are Middle Stone Age, followed by — Early Smithfield, then by the Ngdhla^{**} phase, then by his Transkeian II and III. A Hottentot stage follows, then sites with degenerate Gonaqua and Nguni pottery, then recent Nguni and finally modern Bantu.

Various papers by Johnson (1903A) and by Hewitt — be seen in Goodwin (1935) where short précis of the included material are given. Only two papers refer to the Middelburg district, a paper by Hewitt on Tafelberg Hall (1931B) and another by Zuckerman, the latter of — importance. Other material from Queenstown, etc., can be sought in Goodwin and Lowe (1929) and in Burkitt (1928), where this general area is well discussed. Of special importance is the Glen Grey material described in Goodwin (1928), — the introduction of the term Middle Stone Age. Péringuey discusses sites in the Cradock neighbourhood (1911) found by Cotell.

XI. SOUTHERN CAPE (OUTENIQUAS)

The southern Cape, from Port Elizabeth to Swellendam, is by far the most important archaeological area in Southern Africa. Admittedly it is the bottom of a pocket, reflecting the final bourn of many cultures rather than their relation to cultural history further north. This is an — of perennial rain with two peaks, in March and September; — area where forests have flourished for long centuries. This is the southern wall of the continent, against which culture after culture has made its last stand before inevitably disappearing under the

** I have been unable to locate this stream, or to rectify the spelling.

next wave of peoples. While each culture thrived, it ■ in a strong position to resist inroads from outside; as it collapsed its place was taken by a new wave of stronger culture that could thrive in its turn for a spell, and then depart. Yet with all these waves of culture, with the extraordinary ethnological interest that this area must necessarily evoke, amazingly little is known of the hundred and one caves that have been rifled, sacked and redistributed in the rubbish heaps of a hundred and one deceased estates or scattered over the bankrupt fields of farmers. This has been the playground of the amateur, the relaxation of the holiday-maker who escapes from the labour of fishing to the excitement of picking bones out of a deposit. If any area deserves to become a national reserve for its prehistoric value and importance, this most certainly does. Here nature has always been kind, even lavish, in her generosity to primitive man, and he has been enabled to produce new heights of culture unknown elsewhere. This must have supplied a most important area for secondary cultural dissemination, worthy of keen and thoughtful study and evaluation, not only through the medium of the spade, but through other scientific approaches that ethnology provides.

Changing Sea-levels

We may take as the skeleton of this extremely important ■ paper by G. Mortelmans (1944), a visiting Belgian geologist. His is essentially the geological approach, and in his careful analysis of the Keurbooms River ■ he has described six series of coastal deposits. Their main interest lies in their relationship to beach deposits about the entire continent, and to river deposits inland from the coastal belt. These six deposits have been created or affected by twelve episodes, some of which may be local, while others are of a more general nature, often providing evidence of ocean-wide phenomena.

1. On the site of the present south coast of Africa the sea cut a wide continental shelf towards the end of the Cretaceous period and the lower Eocene. On this is subsequently deposited marine formations, such ■ the Alexandra formations of the Upper Miocene and Mio-Pliocene Age.

2. Important emergences of the sub-continent occurred at a time usually regarded as Upper Pliocene, but more probably, in Mortelmans' opinion, very early Pleistocene and just within the human period. This point would be more adequately proved by the finding of Pre-Stellenbosch implements *in situ* in the appropriate deposits. The original magnitude of this emergence was not — than 100 to 150 feet, though with the accumulation of further emergences, it is now represented by the 500-600 foot plateau connecting with the Tzitzikamma foothills by a gentle slope.
3. The relative smallness of this emergence is shown by the fact that the next marine platform (which is 400 feet above sea-level to-day) has been carved and eroded to perhaps this depth from the preceding bench. The sea has deposited marine material here, including rolled Stellenbosch A; paralleling Vaal Stellenbosch II of the 50-foot terrace — Vereeniging.
4. These deposits — interrupted by an emergence of the sub-continent sufficient to bring that beach to almost the 400-foot level. A movement of this magnitude could not have occurred at the coast without being in some degree reflected in the behaviour and flow of rivers far inland. Mortelmans therefore makes the tentative suggestion that the 50-foot terrace at Vereeniging may be related to the tectonic movements that created the 400-foot emergence here, rather than to climatic oscillation. He finds that (at Keurbooms) this major emergence was accompanied by a semi-arid climate, leading to the formation of ferricrete which cements the old beach and has left concretions on artefacts and pebbles. Mortelmans regards Stellenbosch B tools as "found *in situ*" in the resulting beach deposits.
5. This movement must have been relatively quick and smooth, without interruptions which —ld have left intermediate benches. The old cliff (the lip of subsequent marine erosion) is admirably delineated locally by a slope extending from the coast at — feet, to a height of 400 feet inland. Donga erosion confirms this.
6. In the course of this new erosion period, the — deposited marine gravels, agreeing in height with the terraces of the Keurbooms River. These deposits — dated by a very typical industry, which he makes the type of his Stellenbosch B phase, characterised by the use of the Tachengit technique.
7. At an undetermined time (perhaps between phases B and C of the Stellenbosch, or perhaps corresponding with the

slight emergence during the Middle Stone Age) these marine gravels were raised a further 15 to 20 feet.

8. The rust and aeolian — shown on Stellenbosch C artefacts allow for possible aeolian peneplanation after phase D of this culture. Phase C here compares with Vaal Stellenbosch III and IV.
9. After Stellenbosch D, a semi-arid climate prevailed, producing a formation of lateritic granules overlying the two plateaux, — well as the iron-cemented dunes bordering the 400-foot shelf. Typologically phase D here resembles Vaal Stellenbosch V.
10. Stellenbosch E occurs on the oldest deposits. It perhaps corresponds to a somewhat more humid phase, — panied by some erosion.
11. A new tendency towards aridity is indicated by the iron-cementing of Middle Stone Age material. It is doubtless to this period that the slight 5 to 7-foot emergence of the sandy beach belongs.
12. Black earth, containing Middle Stone Age II, doubtless resorted from the preceding stage, and midden remains, would appear to represent the existing period of erosion and sedimentation, reflecting a further tendency towards a still humid climate.

The disposition of his implement types is given — follows:—

- A. Pre-Stellenbosch (doubtful) found heavily rolled in the 15-20 foot beach, presumably resorted from the 400-foot beach — earlier; — shows subsequent rettrimming. (Two examples only.)
- B. 1. Stellenbosch A found *in situ*, mixed with pebbles from the degradation of the 400-foot beach, showing the same state of wear — these; found resorted in the 15-20 foot beach; found resorted in the lateritic deposits of the plateau.
- B. 2. Stellenbosch B found *in situ* in the 15-20 foot deposits, slightly worn. Few examples
- B. 3. Stellenbosch C and D. Two phases differentiated by their apparent physical condition before they were affected by laterisation in the lateritic horizon of the plateau and corresponding old dunes. Phase C shows aeolian wear, phase D implements are fresh — slightly touched by aeolian polish.

- B.4. Stellenbosch E. A highly evolved Stellenbosch (suggesting even lower Fauresmith) fresh and unaffected by ferricrete, lying on the 15-20 foot beach and on the surface of older formations.
- C. Middle Stone Age. On the surface of the dunes mixed with older types. A second series of Middle Stone Age types was found scattered in black sandy layer about the Stellenbosch dunes.
- D. Later Stone Age. A wide range of midden tools recovered from the surface of all deposits.

While the evidence given is somewhat meagre, and quite insufficient (as he admits) to permit of any firm conclusions being drawn, this local survey should provide the skeleton of future work in this whole area. The various terraces — clearly defined at Knysna, and indeed all along that coast, and should provide the raw material for a dozen local surveys along the stretch of coast from Humansdorp to Swellendam. Little has been efficiently published from here, and the amount of bad excavation, with immeasurable destruction of evidence and loss of irreplaceable material, which has been undertaken in this area, is appalling. If any area needs to be ■ aside as a closed reserve for excavation, this stretch of country deserves that honour. We have the only section of country enjoying a perennial rainfall, in some parts intense, in others far less so; and the only area in which forest cultures could have developed, survived and given their quota to other cultures outside this extremely important zone. This is the chief centre of cultural efflorescence in the southern Union, and an intensive study, both from geological and from ethnological approaches, is essential to a complete understanding of the final stages of cultural evolution along this coast.

Earlier Stone Age

The Earlier Stone Age here, especially towards Knyana, is rendered difficult by the presence of vast Tertiary beds of Enon conglomerate, which while themselves pre-human (or at any rate earlier than any conventionalised human cultures) have supplied every river gravel with material, and have themselves been cut and eroded by lateral streams of later date, which make chronology ■ difficult and often misleading study. These Enon beds provided man with ■ vast and easy

source of raw material for implement making, and his tools have been resorted again and again by surface erosion and by dongas and gulleys that have cut the tools deeply into earlier accumulations of rounded pebbles. To this action should perhaps be attributed the rolled implements found by Breuil (1944C) in what is either Enon or ■ slightly resorted Enon in the lip of the 300-foot peneplain below the Mossel Bay Golf Course.

A posthumous paper by P. W. Laidler (1946) about the area west of Humansdorp and Kareedouw ■ material from the farm Geelhoutboom and elsewhere, is very difficult to disentangle. He gives an exposition of past climates and relates these broadly with the cultural sequence. His Stellenbosch (which he states is Upper Stellenbosch, though made crudely from pebbles) coincides with an early or first wet-phase. The local Middle Stone Age begins with a dry spell, continues through a vegetative and wet period, and ends with the Howieson's Poort transitional culture in a return of a dry windy climate. The Later Stone Age is represented only by half a dozen bored stones, in conditions approaching those of to-day. Somewhat disconcerting ■ his attributions of Victoria West and Tachengit techniques to *coups-de-poing* which he ascribes to his Middle Stone Age. He admits that no Victoria West cores occur; they are the crucial test of the presence of this technique. It is probable that he has predicated the accepted term Middle Stone Age to cover all phases of proto- and full Levallois technique. If this is so it should be possible to follow up his discoveries, and to reassess them both technologically and typologically in the light of considerably augmented data and finds. Apart from this paper, and a few remarks in Goodwin (1930B) the Earlier Stone Age along this stretch of coast is hardly touched.

Further west, at George (Goodwin and Lowe 1929) and at Mossel Bay (mainly unpublished material by J. H. Power) something has been done on the Stellenbosch period, while Lowe in the papers just cited has given an account of Knysna finds of Stellenbosch and Mossel Bay cultures, based upon ■ earlier paper. Perhaps one of the most abundant sites is near Robberg on the Plettenberg coast, which needs careful evaluation by a good quaternary geologist with a knowledge

of this coast. The lavish way in which implements occur here has made this a happy hunting ground for the collector with little knowledge of stratigraphy or the assessment of evidence. The same is true of many hundreds of sites in this belt where (Goodwin and Lowe 1929) almost every river gravel provides material of interest which should permit us to cover the whole gradation of development during the local Stellenbosch period covering many thousands of years.

Still further to the west Dr. C. H. T. D. Heese (1933) has given — a study of the evolution of Palaeolithic technique from Early Stellenbosch to Late Wilton. Dr. Heese is primarily interested in man's developing techniques, rather than in the weave of migration and diffusion or in the various cultural stages that spell out man's history. He draws his evidence largely from Riversdale and Stillbay, and comparative material from his — work at Britstown and Victoria West, and from F. Malan's work in the Wellington area. As in all studies of technology the paper is difficult to follow, and intimate knowledge of both the writer and the implements described is essential before the paper — be efficiently understood. This will eventually be rendered easier by Dr. Heese's generous gift of his collection to the University of Stellenbosch, who published his paper.

Other remarks — the early prehistory of this area can be found in Leith's work (1898) discussed elsewhere. His Stellenbosch site — Mossel Bay is the same as that from which J. H. Power collected an excellent technological series for the McGregor Museum, Kimberley.

Middle Stone Age

H. D. R. Kingston (1900) is mainly remarkable for the manner in which he attacked the deposits in — at the mouth of Grootrivier, east of Robberg and Plettenberg Bay. The first contained only midden material, shore-pebbles and flakes struck from them. The upper layer had already been disturbed by guano-diggers. At the second cave the whole floor was covered by a sealing layer of fine sand, with shell débris beneath. This must have been a relatively early midden deposit which might have yielded most valuable information if approached with even reasonable care. Bored

stones, nacre spoons, bone shell-openers, grindstones, etc., were found. "It is greatly to be regretted", admits Dr. Kingston, "that we had not the means carefully and systematically to remove the different layers of materials and make a thorough scientific examination of the whole of the contents of the cave. . . . Certain people saw fit, after our amateur excavation was completed, to point out how much better it would have been done, had it been done officially." There seems therefore to have been a local conscience present along this coast in those early days. In spite of this confession of criticism Kingston's work and paper are perhaps somewhat better than much of the work carried out in the coastal caves here and elsewhere, up to and since his time. He illustrates flakes resembling Mossel Bay types, made from quartzitic sandstone, and found "in the Knysna caves".

George Leith's excavation at the Mossel Bay cave, and subsequent work done in the remnants of the same deposit (Goodwin and Malan, 1935) have provided ■ foundation for the Mossel Bay culture. The deposits of midden overlying shell-free black cave earth, which contained four layers of Mossel Bay tools, generally compressed into two indistinguishable levels, prove that the Mossel Bay tools here preceded the midden deposit. The analysis of the cave earth proved conclusively that no shell was present, and that the Mossel Bay culture was not associative here with midden. As at the Cape and elsewhere (Goodwin 1933B) there is a relationship between the Mossel Bay material and the Stillbay and Howieson's Poort material. The raised beaches both here and at Little Brak are shown to be contemporaneous with Krige's Minor Emergence (about 20 feet), and to contain water-worn implements of Mossel Bay type. The Abbé Breuil, on examining the evidence recently, expressed the opinion that while every type represented in the beach is present in the cave above, the reverse is not true. In view of the paucity of specimens necessarily available in any beach deposit, this is hardly surprising, but perhaps the implication may be that the beach material is earlier than the earliest phase of the Mossel Bay culture presented from the cave.

In reply to the first reports of this excavation (Goodwin 1933B), Dr. T. F. Dreyer (1934) opposes ■ of the views

expressed. The attack loses some of its force when it is realised that Dr. A. W. Rogers dated the Little Brak deposit ■ contemporaneous with Mossel Bay tools, quite independently of any dating deduced from Cape St. Blaize. It should be noted, too, that the excavation of Mossel Bay cave was undertaken by trained excavators, without the aid of untrained labour, and that the deposit was completely free of stratigraphical complication. The evidence from the beach itself has been more recently confirmed by the independent discovery of further tools of analogous type. In the same way the evidence from Brak River north is a result of notes and sections prepared by Dr. S. H. Haughton, who suggests that the implements here "belong to the end of an arid red-sand period, and to the beginning of the damper period shown by the black sand." Dr. Haughton found no Mossel Bay types in the midden deposits there. The evidence of the cave itself quite certainly places the Mossel Bay implements above a brownish sandy deposit and within a black layer, and Goodwin at no point states that a red layer "is synchronous with the Mossel Bay industry." Evidence accumulating from here and elsewhere proves conclusively that the Mossel Bay industry and the partly contemporaneous Howieson's Poort material belong to a pre-midden period, and it can only be assumed that Dr. Dreyer's observation of midden in association with Middle Stone Age deposits comes from a disturbed site.

Dr. Dreyer's paper does give us some general information that should prove useful in future surveys. He deduces various changes in sea-level, the most important being ■ five-foot beach, and a twenty-foot beach. He seems to suggest that the five-foot beach at the Churchyard, the twenty-foot beach at Klein Brak and the forty-foot beach at Cape St. Blaize are synchronous. He also gives the following stratification from below upwards, at Mossel Bay:

- i. Windblown surface sand, kitchen midden with pottery.
- ii. Black soil. Midden without pottery.
- iii. Grey sandy layer. Mossel Bay tools.
- iv. Red layer. Clacton and Stellenbosch.
- v. Sandy calcareous layer (Stellenbosch).
- vi. Forty-foot raised beach.

At about this time Dr. Dreyer (1933) himself excavated a most valuable cave deposit some miles from here at Matjes River. The paper is accompanied by Sir Arthur Keith's remarks on the skeletons associated. Dreyer describes the implements and associations and shows the following general stratification:

Recent Bushman layer.
Smithfield C (?).
Wilton without pottery.
Mossel Bay industry (developed).
Typical Mossel Bay industry.

He associates extinct types of pig with the developed Mossel Bay and describes the modes of human burial. Since the publication of this cave the site has been revisited by Goodwin and Malan, and enough evidence concerning the general approach and methods of excavation remains to show that this very valuable site might have been made to yield considerable additional evidence and exact information had other methods been employed.

Information on Dr. Heese's Stillbay sites should be sought in general papers.

Later Stone Age

The Later Stone Age in this area can be deduced from the Oakhurst shelter (Goodwin, Drennan and Schofield, 1938) which, while revealing no definite evidence of Middle Stone Age deposits, appears to cover the local prehistory since that time. Apart from the unsatisfactory underlying strata, the following deposits were carefully excavated over a period of years.

Developed Wilton with pottery.
Developed Wilton.
Normal Wilton.
Smithfield C.
Smithfield B.

The pottery is reported on by Mr. Schofield, and the skeletons by Professor Drennan. The total deposit measures some eight feet in depth, and the number of implements and ornaments recovered was very considerable. The most curious fact about the deposit was the presence in the developed Wilton of a large number of crescents made of *Mytilus* shell.

in place of the normal stone crescents. The curious reversal of Smithfield and Wilton layers, compared with Dreyer's finds, is interesting.

The Oakhurst shelter was used as evidence in the dating of coastal fish-traps by Goodwin (1946C). These tidal fish-traps occur frequently about the coast from St. Helena Bay on the west, to St. Lucia Bay on the Zululand coast, a distance of over a thousand miles. They probably extend further, but our information is still very limited, as this is a new field. They cannot be associated with any single existing cultural group, but the evidence provided by their condition shows that these are, in certain instances, prehistoric, though some few are in fairly regular use even to-day. The main evidence adduced — from the Humansdorp coast, the Gouritz River mouth, Cape Agulhas and the Bredasdorp coast generally. There is no previous literature making mention of these traps, and this paper should supply the local amateur with a chance for commencing a useful survey, both of general distribution about our coast, and of the relationship that must exist between these traps and exposed midden sites. Oakhurst shelter showed clearly that while the earlier midden there lacks vertebrate fish remains, these become sufficiently abundant in later layers to prove that man was acquiring a very efficient method of catching fish, and making full use of it.

Other Later Stone Age sites which have revealed remarkable evidence, have not yet been published. These are the various caves in the Tzitzikamma which were excavated by the Port Elizabeth Museum by Dr. Fitzsimons, the Coldstream — excavated by various workers for the South African Museum, and the amazingly rich caves at Robberg excavated for Dr. L. Péringuay by the Rev. Canon W. Sharples. It is to be hoped that the material and evidence from these deposits will be collected, and published as fully and adequately as may be possible. In brief their interest lies in a most peculiar and amazing efflorescence of culture that is — or less localised within the stretch of coast from Cape Robberg to Humansdorp, though many elements of this efflorescence are observable in surrounding areas. This must have been the "capital" of certain phases of Later Stone Age

culture (presumably Hottentot in origin) which showed itself in a vast number of bone tools, made almost exclusively from bird-bones, and the presence of numbers of painted grave-stones. Most of these latter have been destroyed by careless handling, as many of the fine powdered pastel-like paintings have not survived their transport to the South African and Port Elizabeth Museums, or have since been disturbed and so destroyed. It is the presence of material of this type that makes it more and more imperative that a truce should be called within this — on all untrained digging, by whoever it is undertaken. Here South Africa has evidence of value to the world of prehistory and it is essential that it should be protected — far — it is humanly possible.

XII. SOUTH-WESTERN CAPE

This is the true winter-rainfall area, from Swellendam to the mouth of the Olifantarivier and perhaps along the coast for most of the stretch to the Orange. Rainfall is most intense in the south-western corner of the area, and tails off somewhat to the east; it also decreases rapidly towards the north, though certain highlands, such as the Bokkeveld, show better conditions and must have permitted a high density of population at — time. Other mountain areas, such as the Hottentots' Holland range, the Hex mountains, Montagu, and so on, must each have had a history of its own, producing several isolations of culture in secluded valleys. This can be shown to be true in the Botrivier valley and elsewhere during at least a part of the Later Stone Age, and further evidence of isolation must be sought through the medium of local surveys undertaken over a series of years by local enthusiasts, with abundant help from outside on such questions as topography, geology and comparative materials. In all such areas there — schoolmasters with — sincere love of their local environment who might well apply themselves to such a task.

Earlier Stone Age

Apart from a statement by J. C. Smuts (Jun.) referring to finds of Pre-Stellenbosch tools in the Paarl — (I have not discovered the reference) there is little that has so far been

done on early cultures at the Cape. The best broad survey of the relationship between man and changes in sea-level (with which must eventually be related the cutting of river valleys) has been produced by the Abbé Breuil (1944C). He compares with a résumé of the main raised beaches recognised by A. V. Krige (1927), Haughton and Goodwin (1933) and du Toit (1939), from 3,000 foot downwards. Of these he regards it as very likely that the 300-foot beach represents the beginning of the human period, and discusses the evidence at various sites.

The 45-foot beach at Mossel Bay (actually an integral part of the — deposit that twenty yards lower down underlies the war-memorial, at the twenty-foot level) Breuil regards as possibly Late Fauresmith — Early Middle Stone Age, and compares with deposits of similar height in the Fish Hoek valley and on the Eersterivier. Other evidence suggests that, at a relatively late stage in the Stellenbosch culture, the sea reached the 200-foot level.

At Cape Point Middle Stellenbosch tools of two dates occur in consecutive consolidated dunes, overlying a beach 200 to 300 feet above sea-level. At a site south of Simonstown (compare Gracie, 1946) Stellenbosch I and II implements occur up to heights of 280 feet, while the superposed sands reveal unworn Middle Stellenbosch III types. Coarse iron-stained pebbles occur on the crude, heavy boulder gravels in finer deposits. Other sites at Westlake, Constantia and Kirstenbosch are touched upon.

The paper continues with a detailed study of the Eersterivier deposits and the Paarl, Wellington (cf. F. Malan, 1939) and Berg River series. At Lynedoch, where the most comprehensive collection of Stellenbosch types so far collected was put at his disposal by Dr. and Mrs. E. A. Nobbs, the Abbé notes that Stellenbosch III and IV — consistently above the 220-foot contour, together with types suggesting earlier phases, retrrimmed from material collected by early — from above the 300-foot level. In the general area of Stellenbosch all the low-level gravels described by Shand on the Eersterivier (1913) contain Stellenbosch material from the surrounding slopes. In the — way Frans Malan has

shown (1939) that the slopes of the Groenberg, taken with J. C. Smuts' (Jun.) material alluded to above, show the whole Stellenbosch sequence once again.

It is somewhat difficult from this paper to obtain a clear picture of the Abbe's findings. As he himself has made abundantly clear, this work will have to be continued slowly, carefully and on very broad lines by competent workers. This preliminary and admittedly superficial survey, published at the instigation of Dr. A. L. du Toit, forms a most valuable contribution to the prehistory of this area. (See also Breuil 1945.)

The excavation of the Montagu cave (Goodwin 1929B) undertaken by Drs. Haughton and Barnard for the South African Museum, revealed the most important series of Middle to Late Stellenbosch deposits ever found in a cave. This site must have been inhabited during Middle Stellenbosch times, and — eventually vacated towards the end of the Stellenbosch period (though there — no Final Stellenbosch present) and left uninhabited during the Middle Stone Age, until the appearance of the Howieson's Poort Culture, which appears to be mixed with the Wilton, for — division between layers was recognised. The sixteen foot of deposit shows a change from pointed *coups-de-paing* towards true almonds through three Stellenbosch layers, divided by deposits of sand. These suggest the flooding of the cave through some sort of chimney in the highly contorted Table Mountain sandstone of the local deposits. There seems to be — reason to adduce pluvial action; the flooding is more likely to have been the result of local changes in surface drainage.

An excellent and comprehensive paper on the Wagenmakersvallei, by Frans Malan (1939) surveys the typology of generally Middle and Late Stellenbosch tools in a localised area. He shows that here "each new phase is an addition to, as well as a growth out of what has gone before. Old types are not necessarily discarded, but new ones added with which to perform the new tasks consequent to the ever-increasing complexity of human needs." The fundamental unity of the Stellenbosch culture of the Southern Mountains region needs stressing (as is done here) more especially in view of the

tendency to attribute individual finds to particular phases of the culture. Greater familiarity with this long-evolving series shows that a very considerable number of examples, and a clear knowledge of both the site and the culture as a whole, are necessary before reasonable allocation to any particular phase can be made. This paper is fully and comprehensively illustrated by a very clear series of line-drawings. Here we have an excellent example of what a single amateur can achieve within a limited area.

A vast number of other sites is known in this area; many have been touched upon shortly by Péringuey (whose bibliography can be sought in Goodwin, 1935, where it has unhappily been placed under the name of Penning). Many are still unpublished; Goodwin and Lowe refer to others in their "Stone Age Cultures of South Africa" (1929), and Burkitt discusses some in "South Africa's Past in Stone and Paint" (1928). These sources should be referred to consistently for information on other sites in the South-western Cape Region. Final Stellenbosch sites are rare. The best authenticated seem to be in the Fish Hoek valley and in the Somerset West areas.

Middle Stone Age

The Middle Stone Age is here still inadequately understood. Sir Langham Dale's material (mainly from Maitland) belonged to this general period, and was certainly the first series of implements of this *genre* to be described from South Africa. The position is somewhat peculiar. While there is every proof that the Stellenbosch culture covered a vast period of time, and that it started in much the same period here as elsewhere, there still appears to be a gap between the end of that great period and an advanced Stillbay culture. Perhaps this is covered by a Final Stellenbosch (sometimes erroneously called Fauresmith) with small, well-made *coups-de-poing*, but even these are rare. The Abbé Breuil describes all Middle Stone Age material made in Table Mountain sandstone as of Mossel Bay culture, which leads to considerable confusion when types in T.M.S. and in surface quartzites are found cheek by jowl in the same deposit. Whatever cultural phases separate the end of the Stellenbosch from

the beginning of the Stillbay, they have not yet been found, nor is the presence of any such series suggested at all clearly. It is possible that the Stellenbosch is here remarkably persistent, and covers many thousands of years which are bridged elsewhere by various intrusive and local developments.

Broadly the Stillbay seems to be the basic culture of the Middle Stone Age, covering a long period, and evolving into, or giving way to the local facies of the Howieson's Poort culture. Mr. B. Peers, in excavating the Peers Cave (Skildegat) in the Fish Hoek valley (Peers 1929) found the following stratification (which as Dr. E. E. Moasop has since pointed out) does not accord with the measurements and depths recorded in his field notes:

- Microliths and bored stones (Wilton).
- Midden deposit, no conventional implements.
- Stillbay layer (Upper).
- Hybrid culture, intrusive, now regarded as Howieson's Poort.
- Sandstone fragments.
- Stillbay layer (Lower).
- Possible Stellenbosch layer.

A skeleton ascribed to the Upper Stillbay level is described in ■■ addendum by Prof. M. R. Drennan.

According to Dr. Moasop's careful correlation of Peers' field notes it is apparent that, owing to measurements having been taken at different times from different points on the sloping floor of the cave, Peers has interpolated his Howieson's Poort layer between two phases of the Stillbay; whereas his field notes show quite clearly that in the small ■■ in which the Howieson's Poort appears in the deposit, the levels were such that this layer should succeed the normal Stillbay. The stratification should probably be read thus: Lower Stillbay, followed by sandstone fragments then by Upper Stillbay and later by Howieson's Poort, etc. This would make the associated skeleton either Howieson's Poort, or ■■ early midden in date. It is of the greatest importance to note that, apart from this burial, not ■■ iota of bone survived from any layer below the midden. As cooked bone has ■ greater power of survival than uncooked, it is likely that remains of feeding would have survived as long as the interment.

When the Messrs. Peers reached the lower level of the cave, they discovered fragments of quartzitic sandstone which may have been trimmed and fashioned by man. These they assumed were Stellenbosch rejects. The death of both father and son brought the work to a close, but investigations now being set in hand by the Cape Peninsula centre of this Society, should make the position clearer. A cave on Trappieskop, overlooking Kalk Bay harbour, a few miles away, shows similarly an amazing abundance of angular fragments of local quartzitic sandstone, again suggestive of human action, but only suggestive.

Peers goes on ■ describe a shelter, B/102, containing a heavy midden deposit immediately overlying Howieson's Poort material. An associated skull from the lowest levels of the midden has been more recently described by Drennan. Subsequent excavation at this site shows Peers' original deductions to have been correct. Few implements have been recovered from here, but the facies is Howieson's Poort, and does not ■ to overlie any earlier deposits.

Two descriptions of Colonel Hardy's collection of implements (Goodwin 1926 B and Malan and Goodwin 1939) and a short paper on Sir Langham Dale's earlier material (Goodwin 1928C), cover much that is known typologically of the Middle Stone Age at the Cape. A local survey of Saldanha Bay gives ■ a little information from there (Bateman 1946), but far too little is as yet known about stratigraphy and the general history of this period. Many very valuable caves and shelters have been rifled, and evidence lost which might have made clear to us what really happened between Earlier and Later Stone Ages.

Further material should be sought in Goodwin and Lowe (1929), Burkitt (1928) and from other sources. As in all areas, much still remains to be published. All evidence here shows conclusively that the Middle Stone Age was not a midden period, as lime is completely absent from all deposits of that time.

Later Stone Age

An early reference to the Wilton culture comes from the pen of W. J. Lewis Abbott (1913) who described Wilton sites

and types from the sand dunes at Fish Hoek. The material used is the usual red, and grey surface quartzite and is not in any way special, including — it does, crescents, discs, etc. This article followed the discovery of microlithic implements in widely separated regions throughout the Old World, and this additional information from a source so far to the south was considerably appreciated.

Péringuey's description of a site at Bloembosch on the Darling coast (1905A), associating microliths with *Bubalus bainii*, *Equus capensis* and an extinct rhinoceros, probably postdates these animals very considerably. At Simonstown Commander H. S. Gracie (1946) gives a good description of the Wilton — it occurs in the midden deposits in that area; a redescription from another pen that was becoming very necessary. Earlier reports on the usual assemblages here can be got from Goodwin and Lowe (1929) and from Burkitt (1928).

Somewhat surprising was the discovery made by Mr. H. S. Jager a year ago, of an assemblage of small endscrapers and circular scrapers that can only be regarded as Smithfield C. This southward outlier of this inland culture (which also occurs 300 miles to the east at Oakhurst, George, in abundance) lies on the crest of a windy saddle next to the Peers' cave in Fish Hoek valley, from time to time the sand blows over the site, but it was left clear sufficiently long for Mr. Jager to collect a good representative series. This has not yet been published.

From the Citrusdal — a short and popular paper by Dr. K. H. Barnard (1928) describes a small cave on the Krom river, visited by Messrs. Primos, Goodwin and himself, in which a few stylised paintings occur and a Wilton deposit. The material collected is not typical, but probably represents a local facies.

Apart from several early reports on kitchen midden sites in this area, — of which produced very accurate evaluations of the cultures represented, two papers are important. The one is mainly of interest from the point of view of distribution. It is by R. Colson (1905) and gives us an account of middens near Port Nolloth. With the usual agglomeration

of shells, animal bones and fragments of ostrich eggshell, he found crude, chipped tools made from chert pebbles, grindstones, querns, bone awls, a number of potsherds and a shallow pot, and an almost complete specimen, conical, and standing about nine inches high. When found it was partly filled with magnetic iron sand. This last and a skull are in the South African Museum collection. Colson notes the presence of groups of stone standing upright, apparently set up by man; about fifteen groups in all. Nothing seems to lie beneath them.

The other report, though abort, is by Dr. H. A. Shapiro (1932) who undertook the careful excavation of a midden at Gordon's Bay. Two or three important points resulted, since confirmed again and again from other sites: both pottery and the bored stone are late additions to midden culture, and the earlier midden deposits lack both elements, and also, the midden caps the dunes and does not continue as an unbroken series of deposits to the original floor.

Neolithic Elements

Prof. M. R. Drennan (1931) described a stone axe excavated from a small and unprepossessing shelter near Witsands, associated with a human skeleton. This is the furthest south that such elements occur, though a curious stone described by Dr. C. H. Heese (1934C) consists of a flat stone, triangular and bored through the centre, the three angles of which have been sharpened (much like a tailor's crayon) came from Bain's Kloof pass. It is apparently unassociated, and is so far unique. Other Neolithic elements may be looked for in Laidler (1939) and in the other general works quoted above.

In general it is evident that — dealing with an extension from the Outeniqua or South Central region, and not very much — have reached the Cape from the direct north. The distribution of bored stones — to show this to be true in the Later Stone Age, and also draws attention to a few curious distributions within the Peninsula itself. For instance, the distribution here shows that the two beaches

(Atlantic and Indian Oceans) provided two very distinct and separate routes to the Peninsula; the former from the immediate north, the latter from the immediate east. In the [redacted] way, bored stone types are distributed in an apparently erratic fashion so that the Fish Hoek valley links directly with the Hout Bay basin, with little analogy with other sites. The great spur of the Chapman's Peak would suggest that no road existed then between these two points, but the path behind this massive is relatively easy.

PART IV.

GENERAL WORKS

We have dealt with various works on prehistory under their appropriate regional headings, and it has not been found possible to do more than to suggest cross-references to general surveys. Many of these are of extreme importance, and should be referred to for the various in South Africa. An account of our general knowledge of the sub-continent will be given here, again from selected . There are many other works on the subject, but few that are not mentioned here are worthy of much credit. General papers prior to the beginning of our century were touched upon in the Historical section of this volume.

Péringuay (1905) was among the many who wrote on prehistory for the visit of the British Association, invited to South Africa by the newly formed South African Society for the Advancement of Science, of Cape Town. In his somewhat tentative paper he divides the stone age into Recent and Older: the middens seems to be the only Recent deposits, while all else is Older. He mentions sites at Vereeniging and on the Cape Flats.

HADDON AND STOW

Dr. A. C. Haddon's Presidential Address to section on the British Association is an extremely important contribution to subject. He insists strongly upon geological method in archaeology, accurate mapping and localisation of sites, and points out that the workmanship or technique of a particular unassociated find is valueless without additional evidence of age and period. It would probably be to the interest of South African archaeology if the terms 'Eolithic', 'Palaeolithic' and 'Neolithic' were dropped, or restricted solely to types of technique; and it might prove advantageous if provisional terms are employed, which could either be ratified

or abandoned as the consensus of local archaeological opinion should decide."

Later he says, "A few hours of careless excavation may destroy more archaeological evidence than centuries of neglect," and stresses the need for some legislation protecting the archaeological sites and ancient ruins in the country. Haddon's advice — followed by action on the part of the Southern Rhodesia Government.

The — year saw the posthumous appearance of G. W. Stow's researches from 1843 to 1880, which had been in the hands of Miss Lloyd (sister-in-law to Dr. W. H. I. Bleek) and had been handed by her to the historian Theal to be edited. There is little of real archaeological value in the volume. He divides the Bushmen into two streams: Painters and Sculptors, and (although he speaks of an "earlier race") he regards the Bushman as the true aborigines of South Africa. It is clear that Stow attributes all implements to the Bushmen, without any real attempt at differentiation between type or deposit, which is curious in a geologist. He mentions the contents of a cave excavated by himself and C. S. Orpen near Smithfield, and touches upon the work of Alfred Brown at Aliwal North. Apart from this there is little that can be regarded as prehistoric. It is at times difficult to be certain whether Theal or Stow is speaking, and almost impossible to discover how much of Stow's statements were in reality received from Bushmen, and how many were added to the volume (either by Stow or by Theal) augmenting the original evidence in the light of accepted anthropological beliefs current at the time.

JOHNSON, BALFOUR AND PERINGUEY

An early paper by J. P. Johnson (1906) heralds his future interest in the general subject of prehistory. It is a good paper, well illustrated and worth study. His first book (1907) — *The Stone Implements of South Africa* was mainly composed of his earlier publications, brought together into a single volume, but it has the merit of publishing first class original work, if — take into consideration the haphazard methods of those times. Three years later he published two further books (1910 A and B), which cover, in — much aug-

mented form, the work produced in his first volume, and in various papers published later. A full description of the contents of these books is given in the earlier Bibliography and Commentary (Goodwin, 1935).

To celebrate the Act of Union, the London Times published a special South African Supplement, and invited Henry Balfour (1910) to write — the prehistory and ethnology of South Africa. This is an excellent piece of work, perhaps worthy of republication. It is dated rather palpably, but its advice is still of value, and it gives a good idea of the generally accepted view on South Africa's past as seen at that time. Balfour had visited South Africa in 1905, and had showed a very lively interest in the pre- and proto-history of the territory he visited. Dr. Louis Péringuey owed much of his knowledge to his association with this Oxford savant.

It was in the following year that Péringuey launched his famous work (1911) which was to arouse still further the interest in archaeology started forty years earlier, and brought to a peak by the visit of the British Association. He divides his field into three groups: his first (comparable to the Earlier Stone Age) is subdivided into the Stellenbosch and Orange River types, and — additional Griqualand sub-type. It appears to include certain Middle Stone Age elements — well. His second group — to contain part of the Middle Stone Age and the Later Stone Age, under such terms as Aurignacian and Inland Districts type; Solutrean, with Littoral and Cape Flats types; Magdalenian type. The third group covers Neolithic and midden elements. He mentions some eighty or ninety sites somewhat casually, and deals slightly more fully with Paarl, Simondium, Stellenbosch (Bosman's Crossing), Cradock (Cottell's work), Beukesfontein, Nooitgedacht (Vaal), Barkly West, Griqualand West, the Tyumi River, Vereeniging, Fish Hoek, East London, Klein Brak, Hawston and Robberg. He discusses such topics as bored stones, grave-stones, pottery, "boundary stones", etc. A separate chapter on physical remains was written by F. C. Shrubsall. Péringuey inspired many local collectors in his long period of interest, and was himself particularly inspired by Kannemeyer, R. E. Dumbleton, Henry Balfour and others.

Little of general value occurs until 1915, when Péringuey gives his Presidential Address before the Royal Society of South Africa, a Society indebted to this Director of the South African Museum for the essential work behind the grant of a Royal Charter. This paper is mainly a recapitulation of European evidences. He suggests "unmistakable proof" that South African bouchers of Acheulian type were contemporaneous with "the finest and best executed rock engravings, representing wild animals, discovered anywhere hitherto." These are from Kinderdam, Vryburg. After discussing the physical characteristics of the Bushman, he continues: "There is hardly a type of the Solutrean and Aurignacian stone implement that cannot be matched in South Africa. . . . The lithic industry of the Bushmen runs parallel to that of the Aurignacian-Solutrean man". . . . "I claim the Bushman to be the descendant of Upper Palaeolithic man, and to have remained such until his ultimate disappearance, which took place yesterday, because as a unit he is ■ more."

CLIMATES

As early as 1922 South African geologists were beginning to take a keen interest in the climatic changes that had taken place here during Pleistocene times. In that year, Dr. A. W. Rogers produced an important paper on post-Cretaceous climates, based upon ■ wide and intimate knowledge of the approaches then available. He deals here with those evidences of climatic change to be deduced from a study of lithology, topography, fossils, etc. These he applies to post-Cretaceous local climate, and to evidence from South African rivers and pans. He continues by discussing the bearing of faunal, floral and historical evidences. The purely archaeological knowledge available at that time did not permit Rogers to take any advantage of this source, but his paper is an excellent introduction to the many problems that arise in ■ investigation of this sort.

He concludes that there has been no "Pluvial Period" here, in the wide sense of a long continued period of much greater rainfall affecting the whole country, but he does suggest that in the arid summer-rainfall ■ of the Karoo and Southern Kalahari there is evidence that implies that rivers

there might have had a longer period of annual flow, to produce "a more humid era", which came to an end before historical times. Finally he observes that shifts in the relationship between climatic belts occurred in Pleistocene and in subsequent times, similar to analogous phenomena observable in parts of the northern hemisphere, and presumably to be associated with the general glacial period.

THE NEW TERMINOLOGY

In 1925, again from the South African Museum, comes ■ early paper by Goodwin, suggesting affinities between the Smithfield and Lower Capsian, and the Wilton (Pygmy) and Upper Capsian. This paper appeared with a parallel work on the affinities between Bushman and Capsian paintings by I. Schapera. Of greater importance is the fact that this is the first announcement (in a brief and reduced form), of the proposed new terminology, which ■ to be discussed in the following year. The outline was as follows: "An Earlier Stone Age, consisting of one main industry, the typical implement of which is the *coup-de-poing* or boucher, with no accompanying conventionalised worked flakes. This industry is comparable with the Chellean and Acheulian of Europe. No proofs of any Mousterian industry has ■ yet been forthcoming, while the Aurignacian proper, Magdalenian, Solutrean, etc., of the European Palaeolithic appear never to have reached Africa." The Later Stone Age consisted of three industries, the Eastern (later to be developed into the Middle Stone Age), the Pygmy (Wilton), and the Smithfield.

The legislation of 1913, prohibiting the "export of Bushman relics" had proved inadequate; ■ neither "Bushman" nor "Relic" had been sufficiently clearly defined. The sale and export of implements to museums overseas went ■ constantly, but the only results of legislation had been to ensure that no data would be published concerning the sites so rifled. E. L. Gill (1926) raised the whole question once again, stressing the damage done to sites (more especially to cave sites and local stratified deposits) by unauthorised and completely unscientific digging, both by irresponsible persons and by those who merely intended to export saleable material, collected with the minimum of trouble, expense and data.

The same year saw the inadequate publication (Goodwin 1926A) of a report ■ the conference on the proposed new terminology. It was there agreed that the terms Earlier and Later Stone Ages be used to cover various cultures. The Earlier included, at that time, the Stellenbosch, Victoria West and Fauresmith series; the Later included the Stillbay (subtracted from the earlier "Eastern"), the Wilton and Smithfield series. The evidence of Colonel Hardy at the Cape was used to show that the Stillbay preceded the Wilton. Various other papers submitted to the meeting ■ of interest, partly from the historical point of view. Dr. E. C. N. van Hoepen (1926) suggested that the Earlier Stone Age be divided into two phases: the Pretoria Phase, and the Vaal River phase, based upon technology alone. His Pniel culture (also belonging to the Earlier Stone Age) contains a Levallois technique, and was probably ■ part Levallois (similar to Macfarlane's East London material) and in part Victoria West technique. The term Mossel Bay was in fact accepted at this conference, though ■ mention is made of it in the brief report.

Arising out of the Pretoria Conference is a small brochure by Goodwin (1926C), on the stone implement collections in the South African Museum. The subject matter was first published as ■ series of articles in the Cape Times, by whose courtesy it was republished in booklet form. It was held back from publication, and released after the general accept-■ of the new terminology, in August, 1926. Historically this is an important stepping stone, as it gives ■ fuller account of Goodwin's original nomenclature than is to be obtained elsewhere. Unhappily (as in the ■ of the Pretoria Conference) the Middle Stone Age had not yet appeared. A chart giving Goodwin's general theory of the persistence of "themes" through various prehistoric periods is included.

Dr. A. V. Krige's paper (1927) on the raised beaches of South Africa is remarkable. Although it is somewhat meagre, the evidence resulting from an amazing journey on foot about the perimeter of our country was the first real attempt to make a true and broad study of the question of raised beaches. Any future survey of this subject must eventually lead to ■ reassessment of all the evidence ■ already have concerning

this phenomenon. Local research is constantly hampered by the doubts that a local emergence or subsidence may be yielding misleading data, or may be effecting the correlation of beach deposits that in actual fact belong to quite different periods.

M. C. BURKITT

In 1927 M. C. Burkitt, who had been invited to South Africa by the University of Cape Town, gave a short account of archaeological method. This was then a valuable paper, as it laid the foundation for some sort of methodology. He stresses two fundamentals: association with both cultural and geological connections, and the need for the collection of all types of tools from sites. The paper gives a useful approach to sites, and to the problems of recording and preserving material.

In the following year, Burkitt (1928) published his excellent popular work on South African prehistory as seen through the eyes of a visiting scientist. He discusses method, chronology, geology, sites and scenery. ■■■ had been invited to the Union to review the work of Goodwin (an old pupil), and to tour various prehistoric sites. Mr. Goodwin acted as his general guide, while Dr. Hewitt took charge in the Eastern Province, C. van Riet Lowe in the Free State, Neville Jones in Southern Rhodesia, and finally Mr. and Mrs. Burkitt visited Natal alone. The work is therefore very inclusive, and speaks with the authority of this visit, showing an excellent grasp of the facts, the problems and the immensity of the field. He divides the stone age roughly ■ follows:

Lower Palaeolithic influences: Stellenbosch.
Victoria West.
Fauresmith.

Middle Palaeolithic influences: Glen Grey.
Thabanchu.
Alexandersfontein.
Cofimvaba.
Howieson's Poort.
Stillbay.

Later cultures: Wilton.
Smithfield.
Kitchen Middens.

The basis for the terms for the Middle Stone Age was published in the same year (Goodwin, 1928B), and was later included in Goodwin and Lowe (1929) in an augmented form. This latter publication consists of a series of papers by the two authors, best regarded as a single book. It was intended to cover the whole South African stone age and to place the entire study of our archaeological field here on a new basis. After a preliminary note on geography and climate, the Stellenbosch culture, Victoria West culture (as then understood), and the Fauresmith are covered separately, and a large number of widely spread sites described. The Middle Stone Age is given in more detail, including such material as the Glen Grey, Pietersburg, Stillbay, Howieson's Poort, Mossel Bay, Alexanderfontein, Hagenstad, etc. In the Later Stone Age the Smithfield is covered by a magnificent paper by van Riet Lowe, followed by a short addendum by Goodwin. A study of the Wilton, discussions on coastal middens, and the various Neolithic elements complete the volume. Included in the volume is Lowe's original report on Sheppard Island (Vaal River), a paper later extended very considerably by himself.

This year marked the second visit of the British Association to South Africa, and Henry Balfour spoke to Section H on South Africa's contribution to prehistoric archaeology. Unhappily the address had been prepared before the meeting, and misses any reference to the most recent works on terminology, and all changes in viewpoint that had resulted. Another useful booklet produced for the British Association visit, and the Geological Congress, was the anonymous "Livre-Guide" to the International Geological Congress, which contains various archaeological notes *passim*, of which the fullest relate to the Victoria Falls.

C. van Riet Lowe's presidential address to Section E of the South African Science Association (1930) commences with a historical survey and a defence of South African terminology. He stresses the importance of ethnography, geography, and geology as approaches and asks for more detailed local research and site exploration. Presumptive arguments by physical anthropologists regarding the association of race and

culture come in for comment. He deals with prehistoric art, especially paintings and engravings, their associations, study and preservation and the study of sequence. He ends with a plea that the academic institutions in South Africa should do more to support the humanistic sciences.

A paper by Cammiade and Burkitt (1930) deserves brief mention, as it showed that the Victoria West (proto-Levallois) technique is also present in India.

THE ABBÉ BREUIL

The Abbé Breuil was invited to South Africa with the British Association, and had much the same "Grand Tour" that Burkitt had previously enjoyed, under the guidance of such local workers as Goodwin, Hewitt, Kissack, van Riet Lowe, Neville Jones and several others. Two all too brief and tantalising papers (1930 and 1931) are all that pressure of other duties permitted him to publish. He gives a general report on the conclusions arrived at, and in the first paper little new material is described. He does, however, note that Clacton types are present in the Vaal gravels; at Gwelo, etc., and he describes the general relationship of Victoria West and Stellenbosch forms. In the Later Stone Age he gives the two geographical facies: *Smithfield*, which is missing in Rhodesia. He suggests four possible divisions, an industry associable with paintings in the eastern province of the Cape, the O.F.S., etc., being the last. The series shows itself in the progressive reduction in implement sizes. The *Wilton* suggests two geographical groups, widely separated, with scattered sites between, one in Rhodesia, the other at the Cape. The two areas have much in common, bored stones, schist palettes, ostrich eggshell beads, etc. As ■ sites are involved, bone and ivory tools persist here and there. Grindstones, sometimes polished axes, tanged arrowheads with ailerons may be associated.

The second paper covers a vast number of sites very briefly. It is part of a general view of African prehistory. There is little detail, but abundant over-reduced photographs of specimens are given. He divides his chapters into the following headings: Old palaeolithic, Middle palaeolithic, Upper palaeolithic and microlithic, Neolithic and a chapter

on Art. Each subject is treated under broad regions, and provides an excellent bibliography at the end, which is similarly treated regionally.

Just ten years after Dr. A. W. Rogers' paper on post-Cretaceous climates, the Rt. Hon. J. C. Smuts (1932) produced a paper drawing together the available evidence on changing climates in South and East Africa, and related these to man's general story. This comprehensive piece of work aroused a very widespread interest in these aspects of pre-history, and the reader is referred to the original for a more satisfactory understanding of this paper than can be given here. An excellent, though necessarily tentative, series of tables shows the probable relationship between man and past climates, here, in East Africa and in Europe.

LATER WRITERS

Two papers by Dr. C. H. T. D. Heese (1932B and 1933) may be taken together. Both cover the evolution of implement types: the first being mainly a reply to a paper by Josef Bayer, which stated that, in Bayer's opinion, the Palaeolithic of Africa was later than that of Europe, and represented a "belated, reduced copy" of the European. The second has been dealt with earlier, under the Southern Cape; it deals with the entire flow of evolution in Palaeolithic technique.

Professor L. F. Maingard, in his presidential address to Section E of the South African Science Association (1934) pleads for far greater co-operation between ethnology, social anthropology, archaeology, physical anthropology and the study of linguistics. The paper contains a very useful study of the Bushmen and Hottentots, and indicates their general philological relationships. He seems to regard these as representing two divergent developments from a single source, in contrast to the — usually accepted opinion that they were of separate stocks (Bushmen and Proto-Hamite), which merged in part to produce the cattle-keeping Hottentots. The impingement of these peoples on the Southern Bantu is discussed, too. In all, Professor Maingard regards philology as an abundant source for evidence, capable of augmenting the fossil, physical, industrial and artistic evidences we have at our disposal.

The President of the Royal Anthropological Institute, Dr. E. W. Smith (1935) introduced ■ summary of the possibilities of man having evolved in the continent of Africa, and ■ short survey of the archaeological field, into his presidential address for the year. He gives ■ somewhat vague map of the known distribution of Lower Palaeolithic types in Africa, and ends with ■ few notes on the Egyptian developments of the Neolithic. The paper is necessarily condensed and general, but ■ an immense field in time and space.

Goodwin (1935B) bases a comparative paper on an earlier extensive tour of France, Spain and North Africa. Touching prehistory in those countries, he brings the whole to focus on the southern African field, especially the ramifications of the Middle Stone Age. Various major influences ■ enumerated.

Dr. L. S. B. Leakey (1936) in publishing his deliveries of the Munro Lectures ■ Edinburgh, covers ■ vast field. The South African material is the product of much reading and ■ short (all too short from the viewpoints of both guest and hosts) visit by caravan in 1939. The chapter on South Africa (pages 76 to 98) is valuable, especially ■ it contains the views of an expert from a different part of Africa, with a solid foundation of field-work. This work is recommended as an excellent simple introduction to the story of early man in Africa. There ■ several good bibliographies included at the end. Most important ■ his chapters ■ climate and geography, fauna, and the stone age cultures of South Africa. Stone Age art receives a general chapter, which while insufficient for this vast subject, is of extreme interest.

MAN AND CLIMATE

Professor C. van Riet Lowe's (1936C) lecture on "History, prehistory and geology" is a plea for the stressing of the geological aspects of prehistory. "This natural approach should undoubtedly be implemented by the classical—an approach that also needs emphasis, but . . . we cannot afford to ignore the former". . . . "We need to pay particular attention to all problems that relate to Pleistocene and Recent geology. . . Archaeological research obviously demands a keen appreciation of the formations deposited during these climatic changes, and ■ therefore need to understand the

causes that underlie the formation of river terraces, gravels, sands, clays, calcareous tufas, raised beaches and ■■■■■ as well as the effects of rain, frost, solifluction, etc." In the final summing up he demands that archaeologists should have a clear appreciation of the fundamentals of geology, a knowledge of the occurrence, weathering and fracturing qualities of local rocks, and an intimate knowledge of Quaternary geology. Lowe's paper on general regioning (1938A) has already been dealt with in discussing the regional arrangement used in the present Handbook.

A further discussion on climates can be read in van Riet Lowe's lecture (1938C) on "Early man and past climates in South Africa". This ■■■■■ a most useful recapitulation of knowledge to that date, and is simply told, in a form appropriate to its function as ■■■■■ public lecture. There is considerable factual foundation, much of it supplied by the work of Lowe himself. He concludes that much remains to be done in South Africa, and that the close co-operation of zoologists, botanists, soil chemists, physical anthropologists and students of climate, is the only possible approach to ■■■■■ field so rich and so varied as that provided by our country.

THE QUATERNARY PERIOD

H. B. S. Cooke's preliminary survey of our Quarternary period (1941) provides a very complete and important summary of the various deposits; mainly those containing Pleistocene fauna. The stone ■■■■■ sequence, and the definition of the term "Pleistocene" is discussed and related to the survival of fossil species. Raised-beaches, coastal deposits, ■■■■■ fluviatile and cave deposits from the interior, and the general problem of river-terraces ■■■■■ all brought into the picture. He ends with a very complete bibliography, and ■■■■■ useful chart.

B. D. Malan (1942) in a presidential address to Section E of the South African Science Association, asks: When did man first appear in Africa? What is the precise geological background of the Stellenbosch culture? He follows this with an assessment of the validity of European terminology on the one hand, and ■■■■■ purely local system on the other. Local terms he regards as essential, and bears out the need for the retention of technical as well ■■■■■ cultural terms.

Analogies of the Vaal and Zambesi (Cooke and Clarke, 1939) provide the climatic history of the summer rainfall area, and Malan hopes that a similar assessment of the conditions in the winter rainfall area will result from some study of the various river deposits there; though he realises that we are also dealing there with sub-continental tectonic movements, rather than with climatic changes, and these are likely to cloud the issue. The Berg, Eerste and Great Fish Rivers he regards as the most likely sources of information. He touches on the fusion of the flake and core cultures, and on the presence of the hand-axe in the Pietersburg culture in the Transvaal.

All this means that a full and reliable text-book is essential, with a redescription of some of the earlier material, which should eventually lead to considerable illumination of such problems as the relationships between cultures, and unassociated artefacts, colour sequences, etc.

Goodwin's paper on edged-discs and armrings was written (1943) as a sequel to a yet unpublished paper on the bored stone. He shows that there are two distinct groups, or perhaps industrial stages, of the edged-disc. A study of the size of the bore of all known examples shows that only in a very few instances could they have been used as armrings or bracelets. The two types — those with an aperture below 3 cms., and those with an aperture exceeding 4.4 cms. These show a partially differential distribution so far as knowledge goes. The paper should be better appreciated when the larger work on the bored stone makes its appearance. Dr. C. H. Heese (1944) writes to point out that he has in his collection, from the Gordonia district, a lens-shaped stone, and a hollow bowl-shaped stone; the concavity in the latter suggests very strongly that (as in modern lens-grinding by hand) it was hollowed by the grinding of a stone lens suitable for making an edged disc.

B. D. Malan's (1944) short paper on excavation method is a most useful addition to studies in method, and resulted largely from his own experiences in the field in various caves and shelters. It provides a working method for approaching a stratified deposit, and complies with the needs imposed by the permits issued by the Historical Monuments Commission.

Professor C. van Riet Lowe's paper — "Pitfalls in Prehistory" shows the other side of the picture: the need for using commonsense, and for being alert in observing anomalies that cut directly across the accepted ideas of clean stratification and clear delimitation of deposits.

Goodwin's paper (1944) on some Bushman arrows is not primarily intended — — archaeological study, but it shows that the Bushmen of 1878 were sufficiently familiar with the — of glass in making arrow-points to employ it at the Cape.

The first Handbook in this series (1945) is a development of — earlier series of cyclostyled notes for students at the University of Cape Town, with considerable additions. The following points are dealt with: Scope and aims of prehistory, materials, records and their interpretation; natural sources of error; technology and techniques; field research; excavation and geological sites; primitive art; the preservation and packing of finds; how to publish, etc. It contains a bibliography suited to the purposes of the volume.

PART V.

BIBLIOGRAPHY.

While the following names and titles represent a select bibliography, there are certain exceptions. Selection has been made largely on a regional basis; therefore several papers listed are of only slight interest, but they are given in view of the paucity of material from a particular area. In a few instances papers are listed to illustrate small points of value, or to elucidate or link together the work of others upon whose work comment has been made above.

Readers are asked not to judge the value of the work of any archaeologist on a purely numerical basis: some few writers with only a few titles to their names have done foundation work, while others with an accumulation of titles have done nothing but scratch the surface and muddle the issue, so that little of practical or lasting value remains. A third and important group consists of men whose later work has eclipsed and replaced earlier publications, so that much that once had importance has been bettered by these students of our subject themselves. It is hoped a better estimate can be formed from the pages of the commentary given above.

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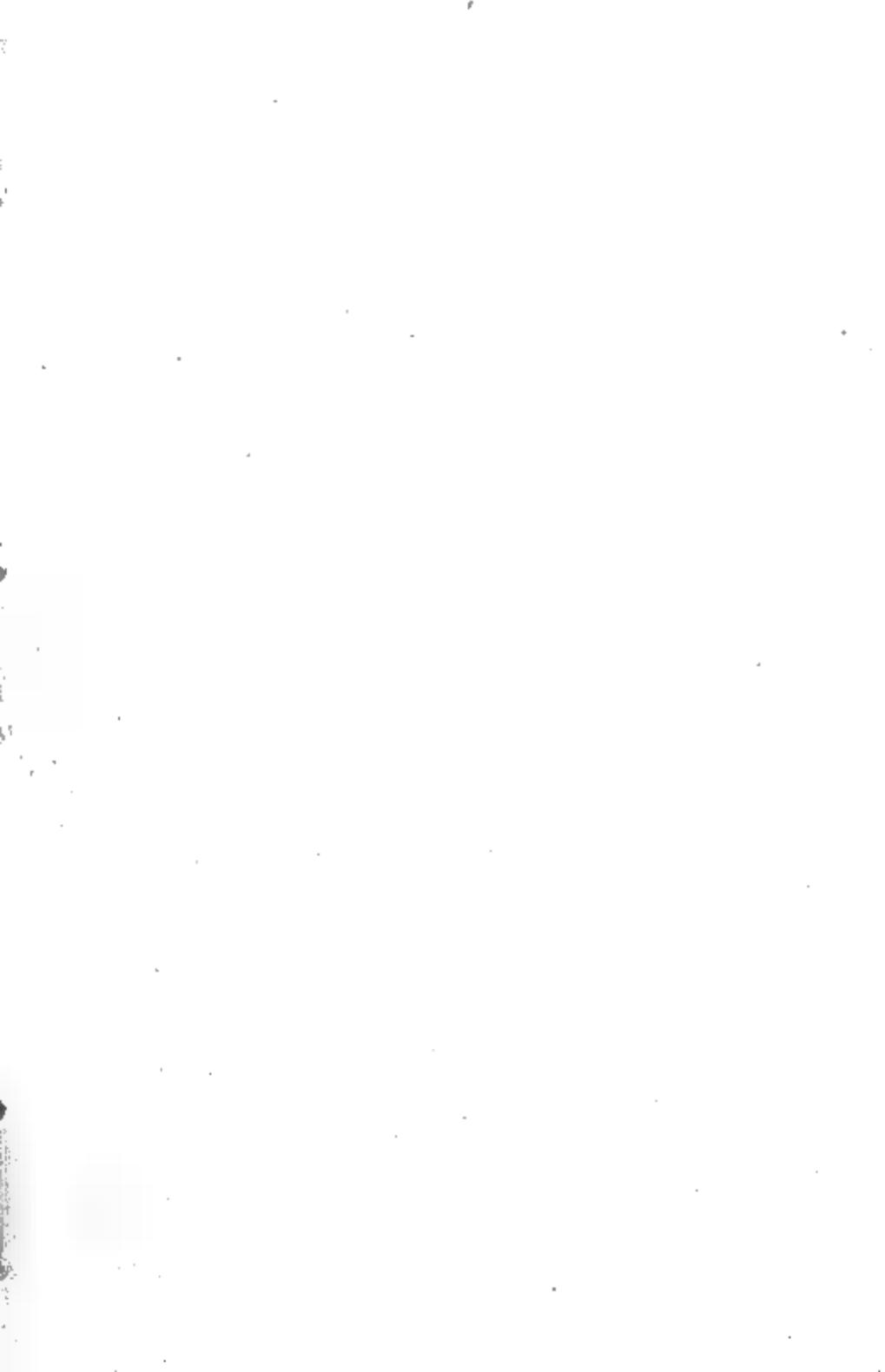
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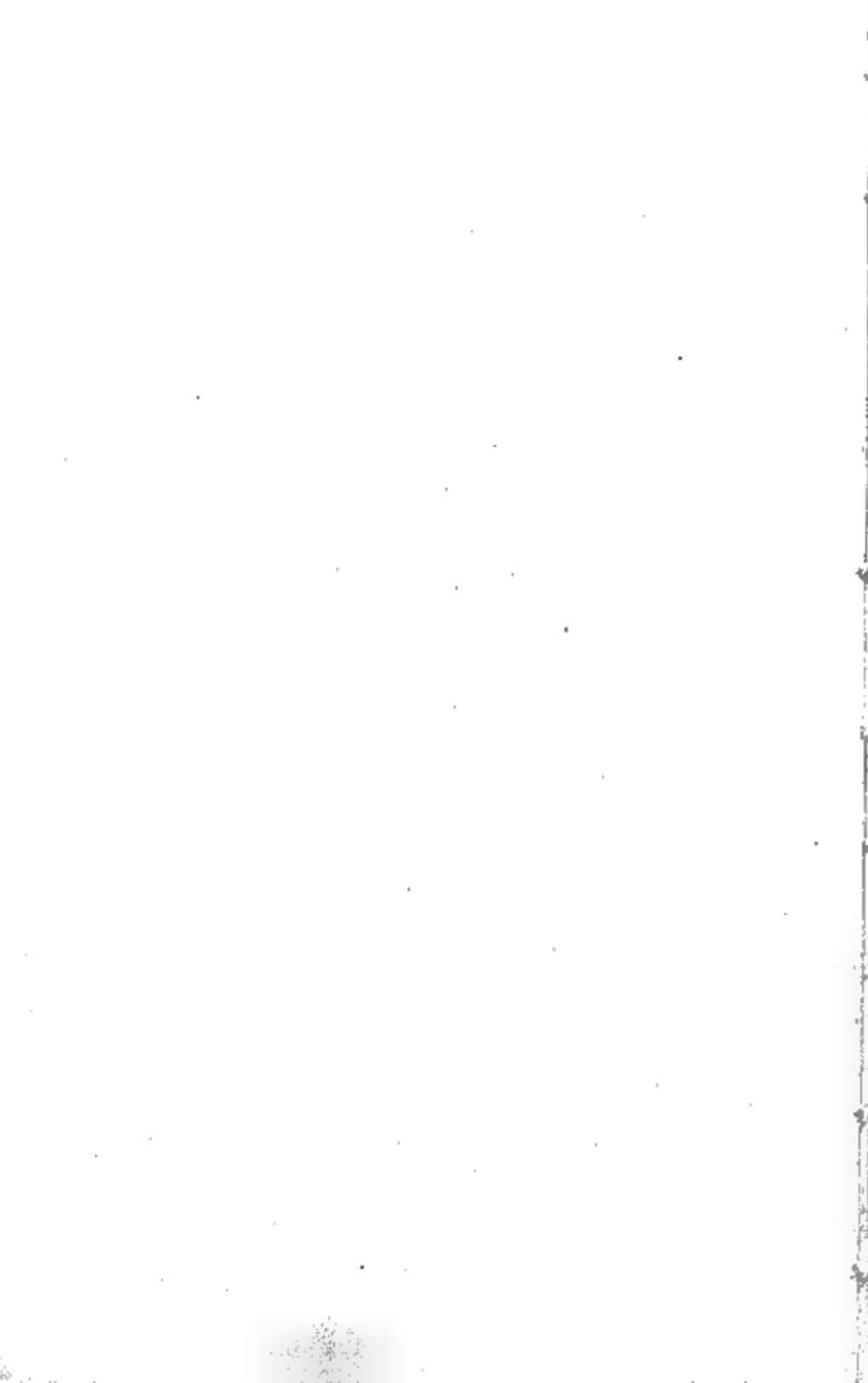
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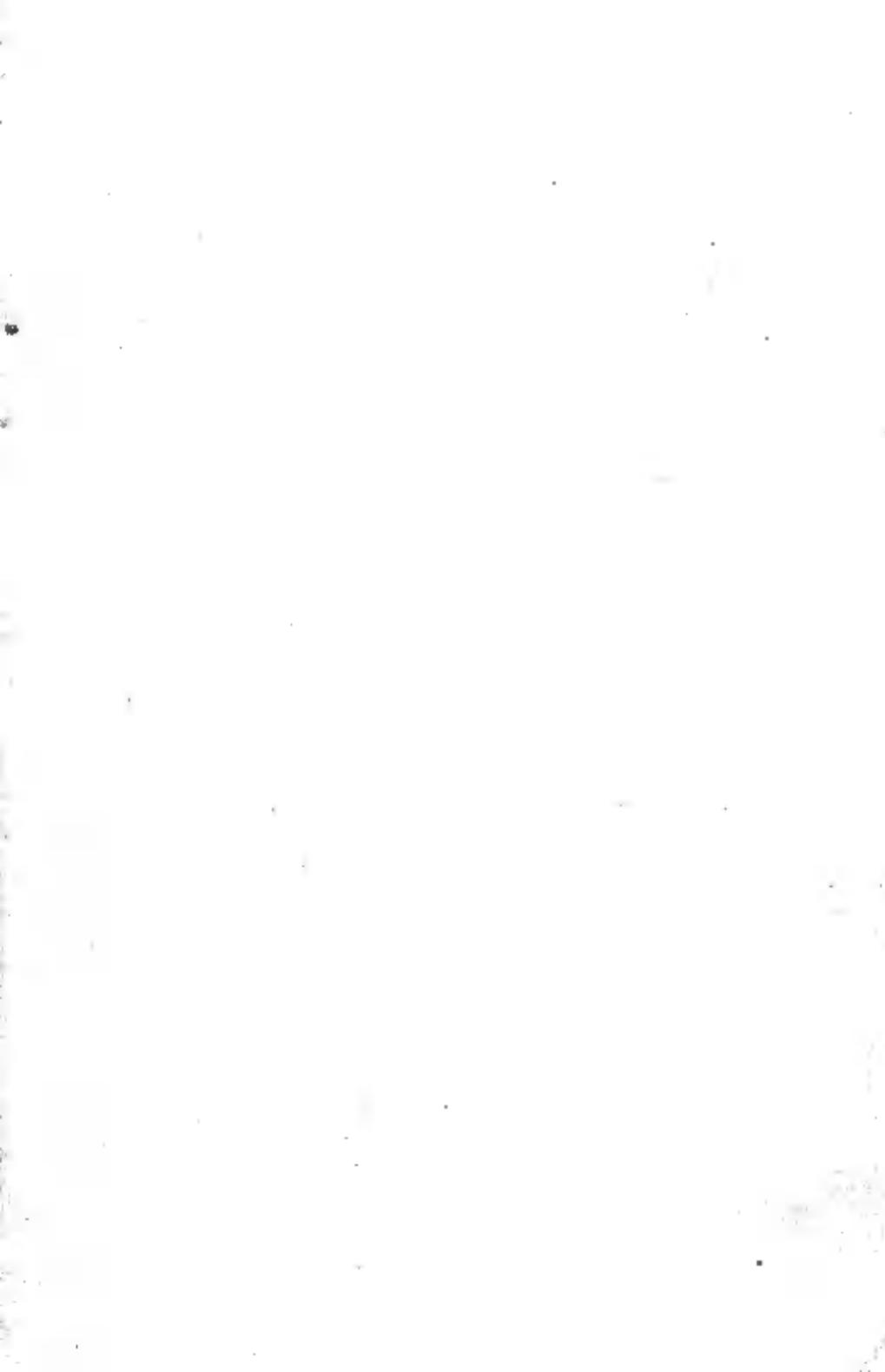
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